

The New Complete Catalogue

Welcome



Günther Blasinger, Director Sales and Marketing

Dear business partner

In the past, we presented our range of products in two different catalogues:

- Technology for Environmental Protection
- Pressure • Temperature • Level

Our statistics show that almost all of our customers worked with both catalogues. Therefore, we have decided to provide you with a complete catalogue which contains all important information on our products in a single volume – technical descriptions, applications, outline drawings and options.

Whether you are looking for solutions for environmental applications, ground water protection, flue gas control, energy saving or general measurement and control technology – the AFRISO range provides proven, competitively priced standard products.

We also develop and manufacture complex customised products as well as complete system solutions – exactly to your specifications.

Going against the general trend, we insist on a high degree of vertical manufacturing integration from our own tool design and construction department all the way to fully automatic assembly machines for electronic components. This makes us fast, flexible and independent.

For us, globalisation is an opportunity to market our products – manufactured in Germany and Europe – on a global scale.

As a medium sized company, we place particular importance on personal contact with you. There are many factors that set AFRISO apart from others – one of them is the people who make up the company. Competent experts provide you with optimum solutions – both technically and economically. Our external sales engineers will be glad to come to your site and assist you in choosing the right products and systems. And whenever you need it, a well trained team of service experts is at your disposal.

We look forward to a successful cooperation.

*Günther Blasinger
Director Sales and Marketing*

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If you have any questions...

Please feel free to contact us!

Telephone: ++49 7135 102 -
(for last 3 digits see extension numbers below!)

Division I

Tank • Heating • Environmental Protection

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Pressure • Temperature • Level

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Division III

Gas Analysis

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Service and Repairs

+49 7135 102-127

Please visit www.afriso.de for further information on contact persons.

Contents and Product Range



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Level - continuous indication: Mechanical, pneumatic, electro-pneumatic, hydrostatic, capacitance, ultrasonic, magnetostrictive, guided micropulse

Level - switches: Float, paddle, conductivity, capacitance, vibration

01

PTC thermistor level sensors for tanks in tank rooms, PTC thermistor level sensors for outdoor tanks, Ex approved PTC thermistor level sensors, overflow alarm systems with Ex and WHG approval, level controllers

02

Alarm units for oil/water separators, maximum level, silt and oil-on-water

03

*Leak detectors - sight glass principle, leak detectors for liquid filled system, vacuum or pressure based leak detectors
 Leak detectors with probes (PTC thermistor, photoelectric, conductivity), drip pans
 Internal linings for fuel oil/diesel/rain water/liquid fertiliser/AHL/AdBlue, tank room linings*

04

*Gas alarms for domestic use, building automation and industrial applications
 Gas alarms for 19" rack mounting and in standard DIN-rail housing, gas sensors, leak test instruments
 Electronic gas and smoke detectors*

05

Mounting accessories, tank fittings, overpressure devices, tank withdrawal systems, anti-siphon valves, pull cord, screw connections, fuel oil filters, filter inserts, automatic fuel oil de-aerators, heating oil meters

06

Motorised boiler room vent, draft stabiliser, boiler water low level alarms, thermal safety valves, combustion controllers, boiler safety equipment groups, safety valves, connection assemblies for expansion vessels, tamper-proof valves, pump connection kits, ball valves, solar pump stations, overflow valves, flow filters, filling devices for heating systems, boiler feed and drain cocks, air vents, distribution manifolds for underfloor heating, thermal actuators

07

Pressure reducers, water filters, non-return valves, strainers, boiler safety groups, safety valves, signal anodes, sacrificial anodes, back-up controller for rain water harvesting systems, Rain Water System Centre, oil tank conversion kits, rain water filter, accessories for rain water harvesting, water treatment

08

Outdoor temperature compensated heating controls, thermostats with timers, room thermostats, differential temperature controllers for solar collectors (solar controllers)

09

Bimetal thermometers and gas filled thermometers, industrial thermometers, thermometer/pressure gauge with capillary tube, thermostats, safety temperature switches, thermostats with housing, electronic thermometers, resistance thermometers

10

Capsule type pressure gauges, Bourdon tube pressure gauges, diaphragm pressure gauges, differential pressure gauges, accessories for pressure gauges, diaphragm seals, electronic pressure instruments, pressure transducers, digital pressure gauges

11

Test instruments for tank servicing and heating systems, leak test instruments for gas and oil pipes, handheld electronic instruments for pressure/temperature/air speed/volume flow/humidity, flue gas analysers, condensate filters, gas treatment systems, water analysis instruments

12

Stationary gas sampling probes, universal filters, gas treatment systems, gas coolers, infrared gas analysers, oxygen measuring probes, oxygen analysers, dust concentration measurement system, volume flow measurement system, compact gas analysis units, emission computer

13

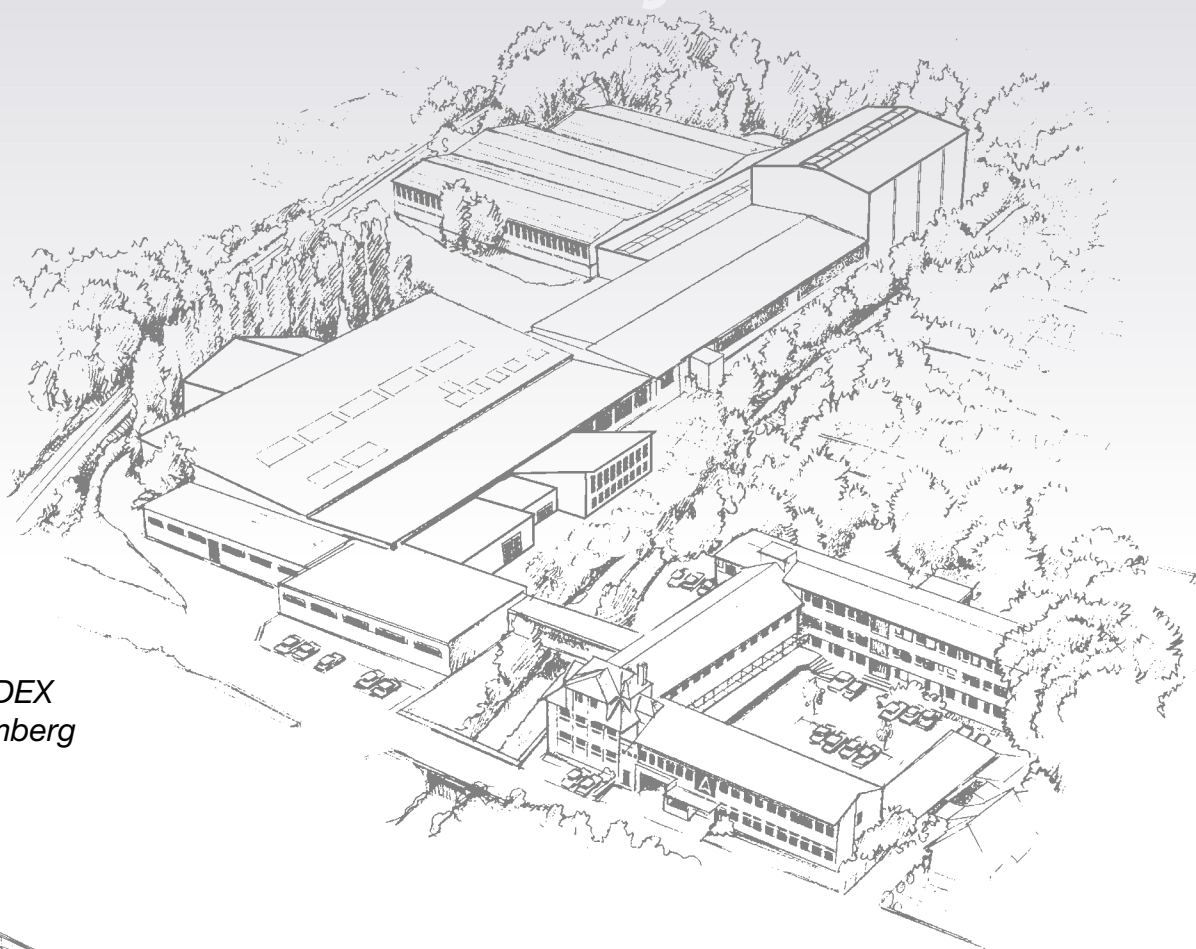
Isolating amplifiers, isolating amplifiers with supply, trip amplifier, selector switch, Ex safety barrier, Ex isolating amplifiers with supply, multifunctional transducer, digital plug-in display, digital display units, alarm lights with horn, alarm re-set unit, event reporting systems

14

Questionnaire/Checklists for enquiries, conversion table for pressure units, selection criteria for pressure gauges, dials for pressure gauges, information on the Pressure Equipment Directive, information on EN 50379, certificates, A-Z product keyword index

15

Location Germany



*Headquarters
AFRISO-EURO-INDEX
Göggingen/Württemberg*

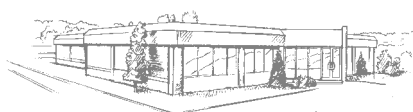


*AFRISO-EURO-INDEX
Dietzenbach/Hessen*



*AFRISO-EURO-INDEX
Amorbach/Odenwald*

*450 of our total staff of 820 are
at work for you in Germany.*



*Systronik
Illmensee/Lake Constance*



A Tradition of Innovation

Measuring, control and monitoring devices for building technology, industry and environmental protection.



Jürgen and Elmar Fritz, great-grandsons of the company founder

Company history

In 1869, our great-grandfather Adalbert Fritz founded his company in Thuringia. When his son Franz Fritz, our grandfather, entered the company, the company name changed to „Adalbert Fritz & Sohn“, or, in short, AFRISO - which became a renowned brand for temperature and pressure measurement.

For 50 years, the company focussed on glass thermometers, medical glass instruments and laboratory equipment.

A small, thin-walled, circular and concentrically shaped metal sheet completely changed the AFRISO world around 1920. Two diaphragm half shells form a capsule element which expands or contracts depending on the pressure.

Precision pressure gauges, blood pressure measurement instruments and temperature controllers became the most important products for the time up to 1945 and the new beginning after that. After World War II, Franz Fritz and his son Georg, our father, rebuilt the company in Kleingartach and in Güglingen/Württemberg. Pneumatic level measurement devices were developed on the basis of pressure measurement instruments, primarily for fuel oil storage tanks.

Other innovations included overflow alarms and leak monitoring systems for the safe storage of mineral oil products. Technology for environmental protection became the main focus of the product range. AFRISO secured the market leadership in this sector.

The early 60s marked the beginning of the internationalisation of AFRISO. AFRISO founded sales and production companies in almost all Western European countries and changed its name to AFRISO-EURO-INDEX.

After the oil crisis in 1973/1974, AFRISO developed a comprehensive range of products for the efficient and environmentally friendly operation of heating systems. After the political change in Eastern Europe, subsidiaries were founded in Hungary, Romania, the Czech Republic, Poland, the Ukraine, Russia and China.

We are now the fourth Fritz generation to lead the company. We are very well aware of the benefits of a medium-sized company with a long tradition of innovation, run by its owners. And we will continue to be reliable partners for our customers, suppliers and employees.

Elmar Fritz, Jürgen Fritz



Georg Fritz 1922 – 2004



Franz Fritz 1890 – 1968



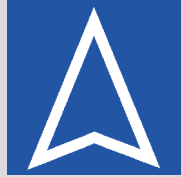
Adalbert Fritz 1846 – 1918

Research

..the people at AFRISO...

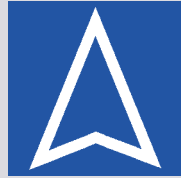
Development

Production





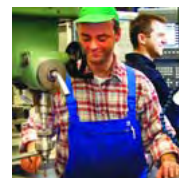
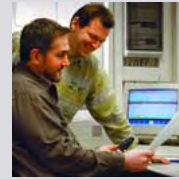
Sales

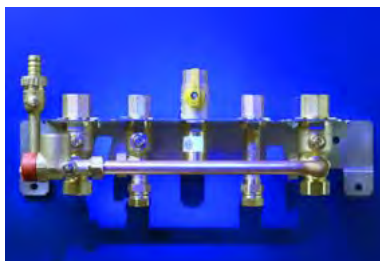


Logistics



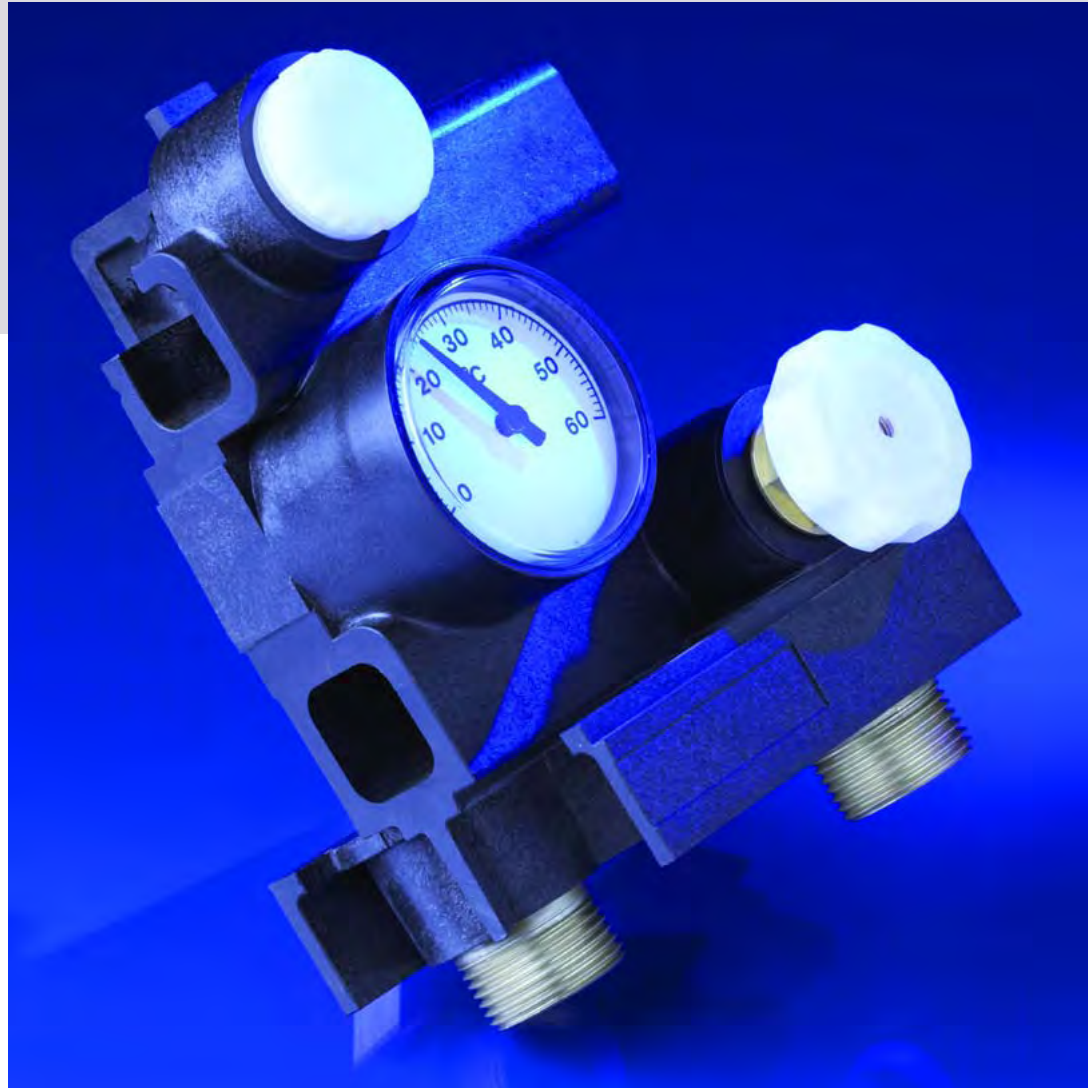
Service





We develop and manufacture complex customised products...

Customised products



In addition to our comprehensive range of standardised, proven off-the-shelf products, we also offer customised special products. Special products may, for example, consist of different housing geometries, shapes, colours, mechanical or electrical connections according to your specific requirements.

Alternatively, various individual products may be combined into a subassembly and delivered as a fully tested unit ready for installation.

System solutions

...and complete system solutions



Our range does not only cover the delivery of individual sensors, but includes suitable components for power supply and evaluation of the measurement signals.

Upon request, we undertake for you the entire engineering of complete control systems.

How to work with this catalogue

Contents

Our product range covers *Measuring, control and monitoring devices for building technology, industry and environmental protection*.

This includes products for ground water protection, flue gas monitoring, effective use of energy, products for using renewable energies (sun and rain) as well as a complete range of pressure, temperature and level instruments. In addition to the products presented in this catalogue, we manufacture many customised products. Please enquire.

Finding information

The catalogue is divided into 15 chapters. A chapter overview is provided on pages 2 and 3. The blue chapter markings assist you in finding the required chapter. Each chapter begins with a detailed table of contents. To find individual products, you can also use the comprehensive A-Z product keyword index in the appendix. Usually, all information on a product is found on one page or cross references guide you to other pages for additional information.

Enquiries

To make enquiries as simple as possible and to assist you in gathering all the necessary information, the appendix contains a number of enquiry questionnaires/ checklists for pressure gauges, level gauges and analysers.

Divisions

Our sales department is divided into three divisions, each with its own area of expertise. This way, we can provide optimum assistance. You can find the division in charge of a given product at the bottom of the corresponding catalogue page.

Delivery times/stock items

All *stock* items have their part *numbers printed in blue* in the lists. Please enquire for delivery times of other items as they vary greatly depending on the specification of the units.

Minimum order quantities

Many products can be manufactured in small quantities. In many cases, you may even order a single piece. However, for some items there are minimum order quantities or packing units which must be observed. The listings provide the appropriate information.

Small order handling fee/minimum order value

For very small orders with net values below € 50.00, a handling fee of € 10.00 will be charged. No other minimum order value restrictions apply.

Return of goods

Please note that we cannot accept the return of any items other than standard stock items.

Prices/terms of delivery

Please refer to your local AFRISO representation or get in touch with AFRISO headquarters for price information. Our General Terms and Conditions apply (see www.afriso.com). This catalogue supersedes all previous versions, including previous prices. All information without prejudice.

Technical modifications

As we are constantly improving our products, we reserve the right to alter technical specifications without prior notice.

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Chapter 1

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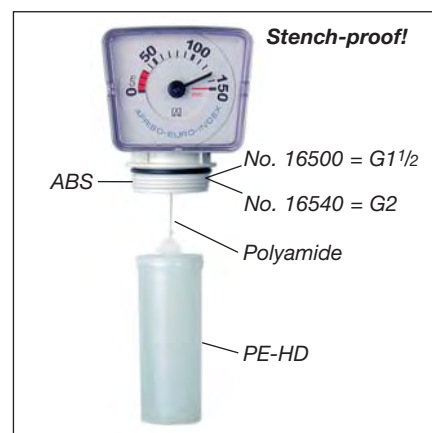
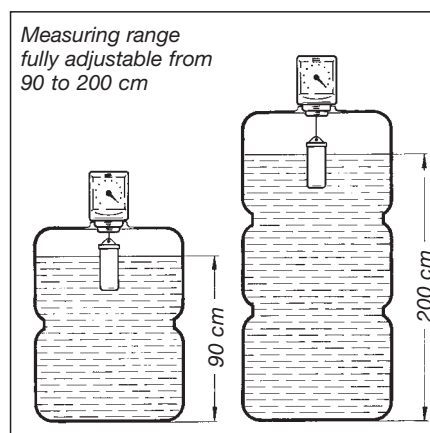
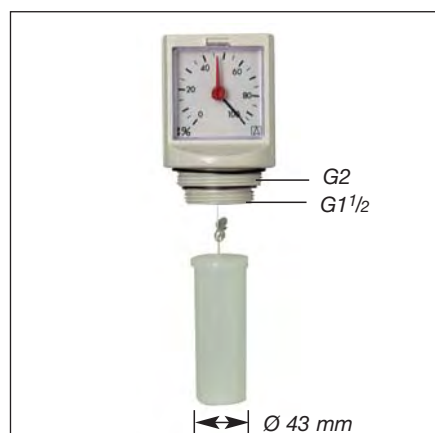
01

Contents gauges, level indicators and level controllers, Overfill alarm systems (capacitance/vibration)

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Mechanical tank contents gauges



Unimes

Universal mechanical tank contents gauge with brass and nickel silver movement. Measuring range fully adjustable from 90 to 200 cm tank height or diameter. All measuring ranges provide a full scale reading with a pointer movement of 270°. Indication in percentage of level. Litre scale can be retro-fitted. Reference pointer for consumption control. Connection thread G1 1/2 and G2. ABS housing and PE-HD float.

- Unimes is the only mechanical contents gauge with litre scale
- High accuracy
- Long service life
- Universal 270° full scale reading

Additional slide-in scales in litres

For Unimes and all standardised tanks. When ordering, please specify the shape and capacity of tank.

Special slide-in scales

For Unimes and tanks of any shape and dimension. When ordering, please include tank drawing or dip chart.

MT-Profil R - 1 1/2 and - 2

Universal, mechanical tank contents gauge with plastic planetary gear. Measuring range fully adjustable from 0 to 250 cm by reversible scale. Reversible scale 0-150 cm and 0-250 cm. Connection thread G1 1/2 or G 2. Stench-proof. Suitable for use in flood risk areas.



Reducer

Reducer G2 x 1 1/2, grey plastic (ABS).

Plastic dipstick

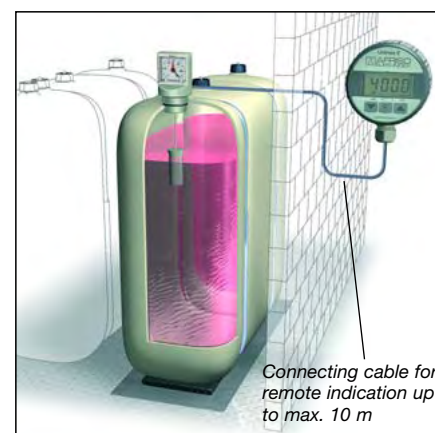
Plastic design with cm graduation. Easy to read. With 100 cm long brass chain. Suitable for use with fuel oil and diesel.



DG: G	PU	Part no.	Price €
Unimes	10	11500	
Additional slide-in scales in litres	1	11900	
Special slide-in scales	1	11999	
MT-Profil R - 1 1/2	50	16500	
MT-Profil R - 2	50	16540	
Reducer	10	20903	
Plastic dipstick:			
Length 170 cm, measuring range 160	10	20010	
Length 210 cm, measuring range 200	10	20011	
Length 260 cm, measuring range 250	10	20012	
Length 300 cm, measuring range 290	10	20013	

* Additional freight charges apply for dipstick lengths of more than 210 cm.

Mechanical Tank Contents Gauges with Electronic Remote Indication Type Unimes E



Application

Continuous tank contents indication in tanks containing light heating oil EL, diesel and other low viscosity liquids which do not attack the materials of the gauge. For tank heights from 900 to 2,000 mm. An additional electronic remote indicator simplifies the taking of readings in installations where tanks are not easily accessible. Suitable for remote indication up to 10 m.

Description

Universal mechanical tank contents gauge with additional electronic remote indicator. The mechanical tank contents gauge is equipped with a fully adjustable brass and nickel silver gear train mechanism. A pointer movement over a 270° scale is provided for tank heights or diameters of min. 900 to max. 2,000 mm. Contents indication is given in % of liquid level. The mechanism incorporates an electronic sensor which generates a signal proportional to the liquid level to drive the remote indicator. The remote indicator is connected to the tank contents gauge via a 3-core screened cable and plug. A long life battery supplies the power for the remote indicator which has a „push-to-read“ function. The built-in microprocessor stores a great number of tank shapes and sizes and provides a choice of display of tank contents in liquid level height or volume. With this

combination of direct mounting gauge and remote indicator a tank contents reading can be taken locally at the tank as well as remotely in a convenient place.

Technical Specifications

Functions

Direct indication in % liquid level.
Remote indication (push-to-read)
Selection of units of indication and total volume calculation.

Measuring range

0-900 to 0-2,000 mm.

Accuracy of measurement

± 3% FSD

Operating temperature range

Medium: 0 °C/+60 °C
Ambient: 0 °C/+45 °C
Storage: -5 °C/+80 °C

Displayed units

Direct reading: 0-100 % liquid level
Remote reading: Litres, m³, %, liquid level in mm, (4-digit 12 mm LCD)

Supply voltage

Direct reading: Purely mechanical system (non-electrical)
Remote reading: 1 x Lithium battery 3.6 V, approx. 5 year life span

Tank connection

G1 1/2 and G2 threads

Housing and Float Materials

Direct reading: Impact resistant ABS, Ø 80, height 100 mm

Float: PE-HD, Ø 42, height 100 mm

Remote reading: PA 6, glass loaded, Ø 75, depth 48 mm

Protection

Direct reading: IP 30 (EN 60529)
Remote reading: IP 51 (EN 60529)

Weight

0.5 kg

Scope of Supply

- Mechanical tank contents gauge
- Electronic remote indicator (incl. battery and wall mounting bracket)
- Interconnecting cable, 10 m long

Features:

- Direct reading at tank and remote indication up to 10 m
- Direct indication at tank without external power supply
- Battery operated remote indication
- Extremely long life through „push-to-read“ feature.
- Convenient control of tank contents with easy-to-read display

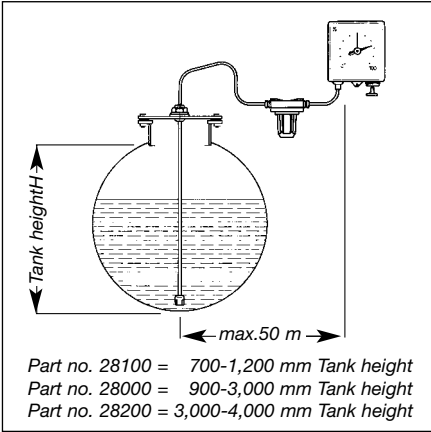
DG: H	Part no.	Price €
Unimes E	52130	

Pneumatic tank contents gauges and level indicators



Unitop 3000

Universal, pneumatic tank contents gauge featuring capsule type movement for remote indication up to 50 m. Accuracy of measurement $\pm 2\%$ FSD. Zero correction and overpressure protection device. Fully adjustable for tank heights between 900 and 3,000 mm at a density of 0.84 g/cm³ (fuel oil and diesel). Reference pointer and date indicator for easy consumption control. Impact resistant plastic housing for wall mounting. Indication in percentage of liquid level. Universal connection for capillary tube with an outside diam. of 6 mm (also refer to pages 15, 104 for Pneumofix and Euroflex). 6 separate litre scales are included for cylindrical, horizontal tanks. (3,000/5,000/7,000/10,000/16,000/20,000 l). Any other scale can be supplied.



Unitop 1200

Similar to Unitop 3000, but fully adjustable for tank height H from 700 to 1,200 mm.

Unitop 4000

Similar to Unitop 3000, but fully adjustable for tank height H from 3,000 to 4,000 mm.

Unitop 2500 for water

Similar to Unitop 3000, but works pre-set for liquids with a density of 1 g/cm³ (water). The symbol shown below is printed on the dial for easy identification.



Additional slide-in scales in litres

Additional slide-in scales in litres for Unitop 3000, Unitop 1200, Unitop 4000 and Unimat. Suitable for all horizontally installed cylindrical tanks. When ordering, please specify the shape and capacity of tank.

Special slide-in scales

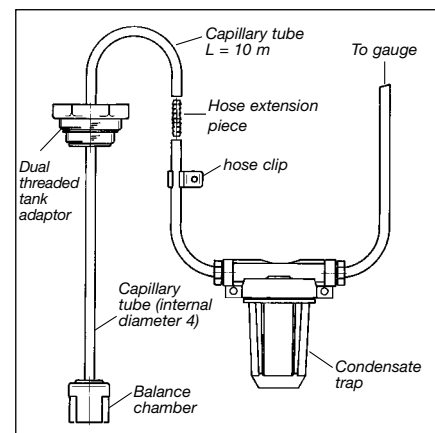
For tanks of any shape and dimensions, suitable for Unitop 3000, Unitop 1200, Unitop 4000 and Unimat. Scales are individually calibrated to customer's specification. When ordering, please enclose a sketch of the tank or a dip chart with exact details of tank shape, size and capacity.

- High accuracy
- Unique movement suspension separated from housing
- Overpressure device
- Consumption control with date indication
- Additional slide-in scales in litres for all tank shapes
- Front adjustable
- Millions in daily use

Please refer to pages 139 to 149 for additional products for rain water harvesting systems.

DG: G	PU	Part no.	Price €
Unitop 3000	10	28000	
Unitop 1200	1	28100	
Unitop 4000	1	28200	
Unitop 2500 for water	1	28002	
Additional slide-in scales in litres	1	289..	
Special slide-in scales	1	28999	

Pneumatic tank contents gauges and level indicators for fuel oil and water



Unitel

Universal, pneumatic tank contents gauge featuring capsule type movement for remote indication up to 50 m. Accuracy of measurement $\pm 3\%$ FSD. Zero correction and overpressure device. Fully adjustable for tank heights between 900 and 3,000 mm at a density of 0.84 g/cm^3 (fuel oil and diesel). Reference pointer for easy consumption control. Impact resistant plastic housing for wall mounting. Indication in percentage of liquid level.

Universal connection for capillary tube with an outside diam. of 6 mm (also refer to page 104 for Pneumofix and Euroflex).

Additional slide-in scales in litres

For Unitel and Unitel for water. For all standardised tanks. When ordering, please specify the shape and capacity of tank.

Special slide-in scales

For Unitel and Unitel for water. For tanks of any shape and dimension. Scales are individually calibrated to customer's specification. Please specify exact tank shape, size and capacity.

Please refer to pages 139 to 149 for additional products for rain water harvesting systems.

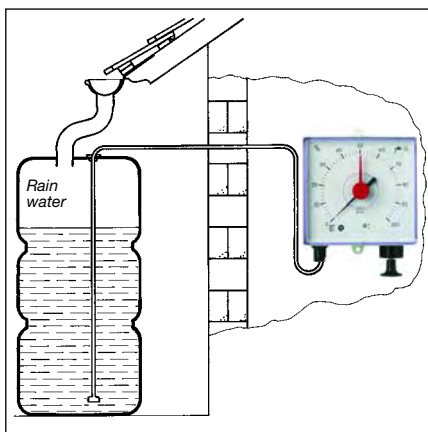
Unitel for water

For remote indication up to 50 m, with capsule type movement. Accuracy of measurement $\pm 3\%$ FSD. Zero correction and overpressure device. Fully adjustable from 900 to 2,500 mm tank height for liquids with a density of 1 g/cm^3 (water). Reference pointer for easy consumption control. Impact resistant plastic housing for wall mounting. Indication in percentage liquid level. Universal connection for capillary tube with an outside diameter of 6 mm (e.g. Pneumofix or Unitel-Montagefix-Water).

Unitel-Montagefix-Water

Complete mounting kit for installation in rain water harvesting systems with all necessary installation accessories.

Scope of supply: Unitel for water, 310 cm capillary tube with balance chamber, 10 m PE capillary tube 4 x 1 mm and installation accessories.



Pneumofix

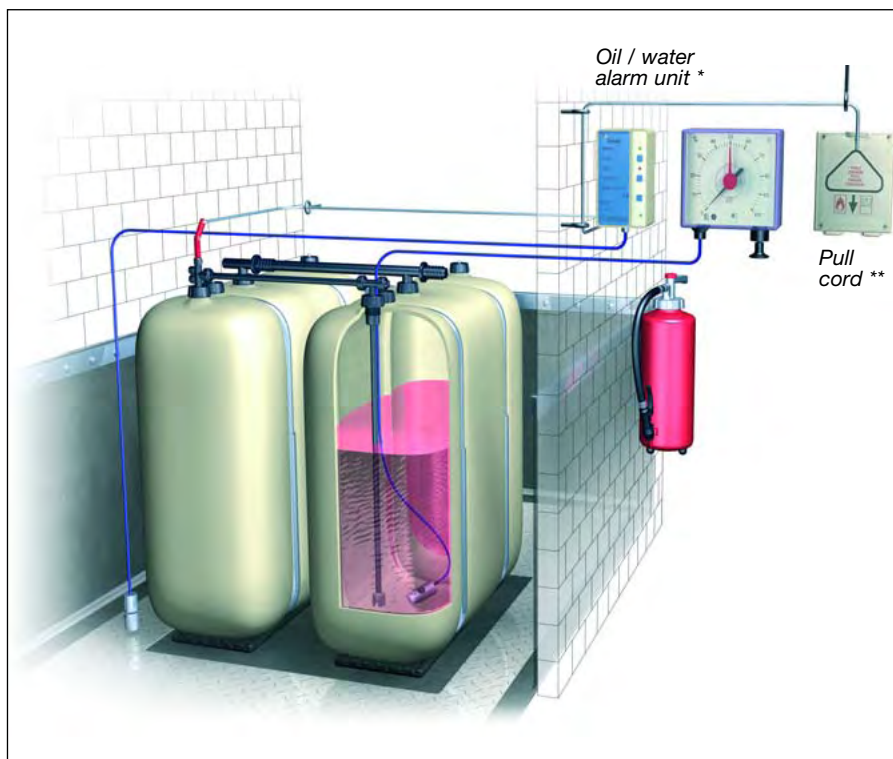
Complete, universal mounting kit for pneumatic tank contents gauges and level indicators. Suitable for tanks of up to 300 cm in height or diameter. Consisting of dual threaded tank adaptor G1 and G1 $\frac{1}{4}$, reducer G1 x G1 $\frac{1}{2}$ x G2. Capillary tube in tank (310 cm long) with balance chamber, condensate trap. Capillary tube made from polyethylene, 10 m. Hose clips and steel nails, capillary extension piece. If no connection socket is available at the tank, we recommend the use of Euroflex (refer to page 104).

Montagefix extension set

10 m PE capillary tube 4 x 1 mm with capillary extension piece.

DG: G	PU	Part no.	Price €
Unitel	10	72500	
Unitel for water	10	72511	
Unitel-Montagefix-Water	10	72499	
Additional slide-in scale in litres	1	725..	
Special slide-in scale	1	72599	
Pneumofix	10	20153	
Montagefix-extension set	10	20132	
Capillary tube 50 m	1	20158	
Capillary extension piece	10	20036	

Tank contents gauges with mounting kit for plastic battery type tanks



This mounting set enables quick and easy retrofitting of plastic battery type tanks without interruption of regular operation.

- Instant installation - no problem!
 1. Drill a hole into the flange
 2. Install the capillary tube
 3. Check the level

Benefits:

No components need to be dismantled for installation. Oil carrying pipes do not need to be dismantled and then recommissioned and de-aerated.

Many plastic fuel tanks become opaque over the years due to sediments, dirt and age. Often there is no spare connection available for a gauge. This special mounting kit makes it possible to connect a pneumatic remote reading contents gauge. There is no need to switch off the burner.

Many withdrawal systems already have corresponding markings on the mounting flanges for the drilling of holes.

Attention:

In most cases, it is prohibited to drill through the tank wall. This may render the warranty for the tank null and void.

Unitel-Set

This universal, pneumatic tank contents gauge for remote indication up to 50 m comes with a mounting kit for installation on plastic battery tanks. Accuracy of measurement $\pm 3\%$ FSD. The unit is fully adjustable for tank heights from 900 to 3,000 mm for fuel oil EL or diesel (density = 0.84 g/cm^3). Reference pointer for easy consumption control. Indication in percentage of liquid level. The mounting kit consist of the capillary tube 2.10 m with balance chamber ($\varnothing 9 \text{ mm}$), self-sealing tank adaptor for a 10 mm hole, 10 m capillary tube, hose clips, steel nails and a capillary extension piece.

Unitop-Set

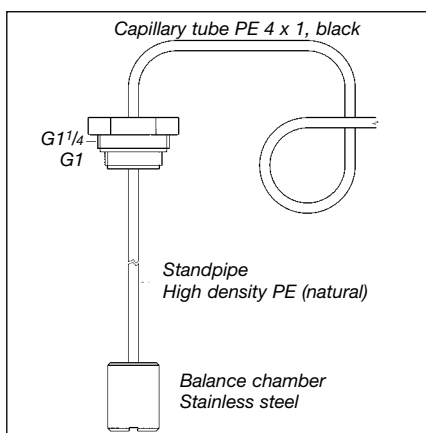
This universal, pneumatic tank contents gauge for remote indication up to 50 m comes with a mounting kit for installation on plastic battery tanks. Accuracy of measurement $\pm 2\%$ FSD. The unit is fully adjustable for tank heights from 900 to 3,000 mm for fuel oil EL or diesel (density = 0.84 g/cm^3). Reference pointer and date indicator for easy consumption control. Indication in percentage of liquid level. Litre scales are available (a request card is included with the kit). The mounting kit is identical to the Unitel kit.

* Refer to page 86 for an oil/water alarm unit.

** Refer to page 108 for a pull cord.

DG: G	PU	Part no.	Price €
Unitel-Set	10	72512	
Unitop-Set	5	28004	

Pneumatic Tank Contents Gauges for AdBlue® – Unitop-Set AdBlue



Features:

- Specifically calibrated for AdBlue®
- Universally adjustable
- Simple installation
- Complete with specific mounting kit
- No external power supply required

Application

Continuous tank contents indication in vessels containing AdBlue® (s.g. 1.09 g/cm³).

For tank heights from 700 to 2,300 mm. Suitable for remote indication up to 50 m. AdBlue® is identical to „NOx-reduction material AUS 32“ and „urea solution 32.5 %“.

Description

Universal pneumatic tank contents gauge with capsule gauge movement. Especially calibrated for AdBlue® specific gravity of 1.09 g/cm³. Fully adjustable over a tank height range from 700 to 2,300 mm. Measuring accuracy of ± 2 % FSD. Indication in % liquid level, optional slide-in scales, calibrated in litres, are available.

Front access to zero correction, adjustable reference pointer and date display for simple consumption control and integrated over-pressure device. Universal capillary connector for rigid or flexible capillary tube with outside diameter of 6 mm. Easy installation with the specific AdBlue® mounting kit. Process connection G1 and G1 1/4, high density PE standpipe, 2.5 m long with stainless steel balance chamber, 10 m of PE 4 x 1 capillary tube.

Technical Specification

Measuring range

0-700 to 0-2,300 mm tank height

Accuracy of measurement

± 2 % FSD

Operating temperature range

Medium: 0 °C/+35 °C

Ambient: -5 °C/+55 °C

Storage: -5 °C/+55 °C

(Please refer to legal requirements for the storage of AdBlue!)

Dial

0 to 100 %

Displayed units

Indication in % liquid level

Housing

Wall mounting housing, impact resistant plastic, with integrated hand pump

W x H x D: 155 x 166 x 73 mm

Process connection

G1 and G1 1/4

Standpipe

High density PE plastic (natural)

Balance chamber stainless steel

Length 2.5 m

Capillary tube

PE capillary tube 4 x 1 mm

Length 10 m

Scope of Supply

Tank Contents Gauge and Mounting Kit

Options

- Additional slide-in-scales in litres, see page 14
- Capillary extension, see page 15

When erecting AdBlue® storage facilities it is important to follow the legal installation requirements regarding suitable materials.

For suitable tank overfill alarm systems see page 62, for suitable internal tank linings see page 81.

DG: G	PU	Part no.	Price €
Unitop-Set AdBlue	1	28040	

Electro-pneumatic tank contents gauges



Unimat 3000

Application

For continuous level measurement in tanks containing fuel oil EL or diesel.

For tank heights from 900 to 3,000 mm. Suitable for remote indication up to 50 m.

Description

Universal, electro-pneumatic tank contents gauge with capsule type movement and electrical pump for continuous indication.

Fully adjustable from 900 to 3,000 mm tank height.

Accuracy of measurement $\pm 2\%$ FSD.

Indication in percentage of liquid level. Litre scales are optionally available.

Front access to zero correction, reference pointer for easy consumption control as well as integrated overpressure device.

The visual and audible alarm signals for low level are adjustable between 5 and 30 %.

Relay contact for external alarms.

Electrical connection AC 230 V via mains plug.

Capillary tube connection for tubes with an outside diameter of 6 mm.

Easy installation by means of Pneumofix mounting kit (refer to page 108) or Euroflex 3 combination fitting (refer to page 104).

- Unimat with continuous indication and low level alarm
- As soon as the low level (5-30 %) is reached, visual and audible alarm signals are triggered. In addition, a built-in relay provides contacts for ancillary alarms.
- The audible alarm can be muted.
- Indication in percentage of level.
- Additional slide-in scales in litres are available for all DIN tanks.
- Refer to page 14 for special slide-in scales for non-DIN tanks.

Technical specifications

Measuring range

0/900 to 0/3,000 mm oil column

Accuracy of measurement

$\pm 2\%$ FSD

Operating temperature range

Ambient: $-5\text{ }^{\circ}\text{C}/+55\text{ }^{\circ}\text{C}$

Storage: $-25\text{ }^{\circ}\text{C}/+55\text{ }^{\circ}\text{C}$

Dial

0 to 100 %

Displayed units

Indication in percentage of liquid level

Capillary connection

Universal connection for rigid or flexible capillary tube, 6 mm

Supply voltage

AC 230 V

Power consumption

Max. 15 VA

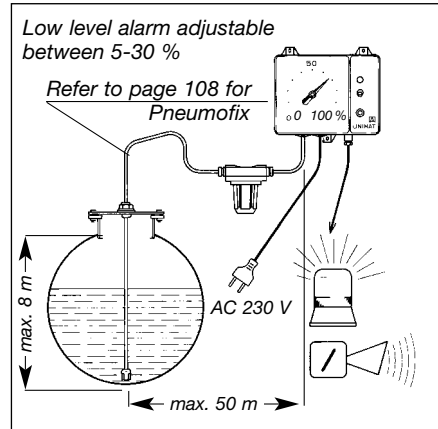
Relay output

Relay contact: 1 voltage-free changeover contact

Contact rating: AC 230 V 2 A

Visual indication

Red lamp for low level alarm



Audible alarm

Integrated piezo-buzzer

Housing

Wall mounting housing made from impact resistant plastic (ABS)

W x H x D: 215 x 165 x 130 mm

Protection

IP 30 (EN 60529)

Weight

2.3 kg

Unimat 8000

Similar to Unimat 3000 but works pre-set for tanks with heights between 3,000 and 8,000 mm.

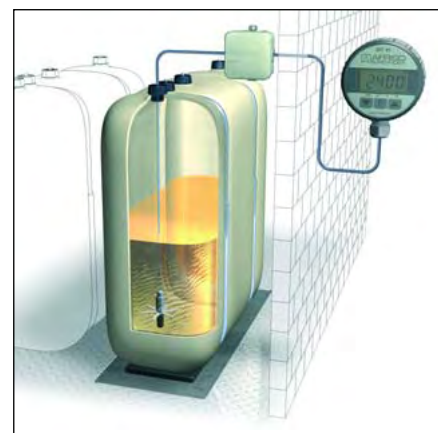
When ordering, please specify the desired tank height and the density of the liquid to be measured.

Options/Accessories

- Additional slide-in scales in litres for DIN tanks
- Special scales in litres
- Pneumofix mounting set
- Euroflex 3 combination fitting

DG: G	PU	Part no.	Price €
Unimat 3000	1	26000	
Unimat 8000	1	26100	

Digital tank contents indicator DIT 01 for fuel oil and diesel fuel



Application

For continuous level measurement in tanks containing fuel oil EL, L or diesel. Specially suitable for underground tanks and basement tanks. For liquid levels from 0.9 to 3 m.

Description

The hydrostatic level measurement system consists of an evaluation unit with digital display (display unit) and a submersible probe with integrated pressure measuring cell.

DIT 01 features the following:

- Universal application in tanks with up to 3 m in height or diameter.
- No dip charts required since all standard tank shapes are stored.
- Fast and safe mounting with complete installation accessories.
- No external supply voltage required.
- Push-to-read function for extremely long battery service life.
- High accuracy of measurement due to electronic sensor (pressure measuring cell).
- Display unit with easy-to-read display.
- Simple operation via menu-guided set-up procedure.
- Connection cable of the display unit can be extended by up to 10 m.

Technical specifications

Functions

Push-to-read, switching of displayed units, calculation of total volume

Measuring range

0/300 mbar

Accuracy of measurement

±1.5 % FSD

Operating temperature range

Medium: 0 °C/+60 °C

Ambient: 0 °C/+45 °C

Storage: -5 °C/+80 °C

Display

4-digit, 12 mm high

LCD 7-segment display with additional symbols

Displayed units

Litres, m³, %, height in mm

Submersible probe

Housing stainless steel 1.4305

Cable PVC, 5 m with breather tube

Diaphragm stainless steel 1.4435

Seals FKM

Spacer POM, PE

Supply voltage

1 x lithium battery 3.6 V (included)

Service life approx. 5 years

Housing

PA6, glass loaded, grey, Ø 75 mm, with wall mounting bracket, protection IP 51 (EN 60529)

Scope of supply

DIT 01

- Evaluation unit with digital display
- 5 m connection cable to probe (can be extended by max. 10 m)
- Junction box, protection IP 55 (min.)
- Submersible probe with 5 m submersible cable
- Screw connector set G1 x G1½ x G2
- Mounting kit for withdrawal flange (PG 9 gland)
- Wall mounting bracket

DIT 01-E

- Evaluation unit with digital display
- 5 m connection cable to probe
- Junction box, protection IP 55 (min)
- Submersible probe with 5 m submersible cable
- Combination fitting Euroflex 3 (suction and return pipe with integrated submersible probe, connection thread G1)
- Wall mounting bracket

DG: H	Part no.	Price €
DIT 01	52122	
DIT 01-E	52123	

Digital tank contents indicator DIT 02 for water



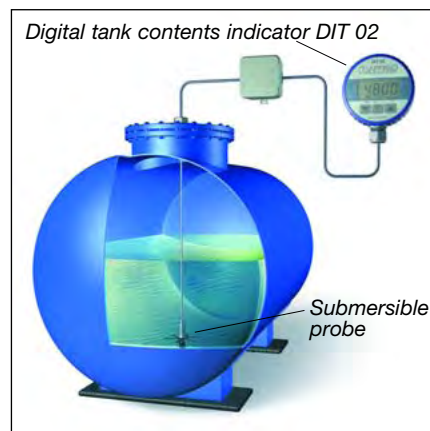
Display unit



Submersible probe



Digital tank contents indicator DIT 02



Application

Specially suitable for continuous level measurement in rain water tanks and cisterns.
For liquid levels from 1 to 4 m.

Description

The hydrostatic level measurement system consists of an evaluation unit with digital display (display unit) and a submersible probe with integrated pressure measuring cell.

DIT 02 features the following:

- Universal application in tanks with up to 4 m in height or diameter.
- No dip charts required since all standard tank shapes are stored.
- Fast and safe mounting with complete installation accessories.
- No external supply voltage required.
- Push-to-read function for extremely long battery service life.
- High accuracy of measurement due to electronic sensor (pressure measuring cell).
- Display unit with easy-to-read display.
- Simple operation via menu-guided set-up procedure.

Technical specifications

Functions

Push-to-read, switching of displayed units, calculation of total volume

Measuring range

0/400 mbar

Accuracy of measurement

±1.5 % FSD

Operating temperature range

Medium: 0 °C/+60 °C

Ambient: 0 °C/+45 °C

Storage: -5 °C/+80 °C

Display

4-digit, 12 mm high

LCD 7-segment display with additional symbols

Displayed units

Litres, m³, %, height in mm

Submersible probe

Housing stainless steel 1.4305

Cable PVC, 6 m with breather tube

Diaphragm stainless steel 1.4435

Seals FKM

Spacer POM, PE

Supply voltage

1 x lithium battery 3.6 V (included)

Service life approx. 5 years

Housing

PA6, glass loaded, blue, Ø 75 mm, with wall mounting bracket, protection IP 51 (EN 60529)

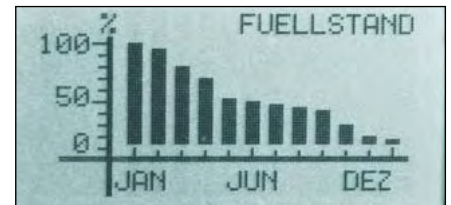
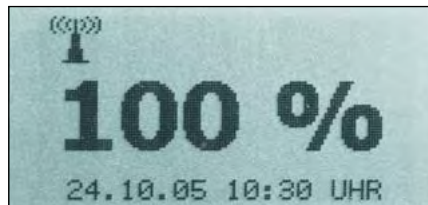
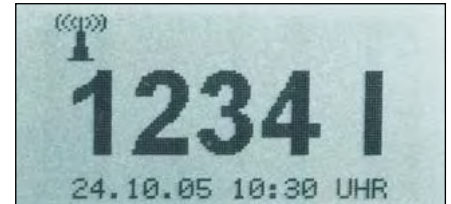
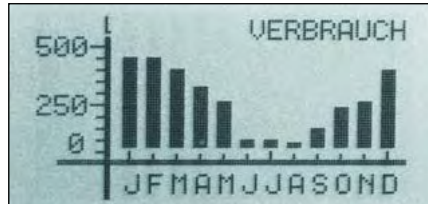
Scope of supply

- Evaluation unit with digital display
- 15 m connection cable to probe (cannot be extended)
- Junction box, protection IP 55 (min.)
- Submersible probe with 6 m submersible cable
- Screw connector set G1 x G1½ x G2
- Mounting kit for 15 mm hole (PG 9 gland)
- Wall mounting bracket

DG: H	Part no.	Price €
DIT 02	52124	

Hydrostatic Level Indicator TankControl 01 for Fuel Oil and Diesel

new



Application

Continuous reading level indicator with graphic display of level, rate of consumption, forward coverage of fuel based on past consumption as well as as minimum fuel level alarm (reserve). Suitable for tanks from 0.9 to max. 3 m liquid height. For light fuel oil EL, L or diesel. Remote indication up to 15 m. Especially designed for modern housing technology.

Description

The hydrostatic level indicator system consists of a display instrument with graphics and a submersible probe with integrated pressure transducer.

Choice of read-out in litres, m³, %, or liquid level in mm. When a pre-set minimum level, which is fully adjustable, is reached, a visual and audible alarm is initiated by the indicator. (The audible alarm can be muted). An additional relay contact is provided for the connection of additional alarm units or telecommunication and housing technology control systems.

The integrated microprocessor enables the user to call up on the display important information such as fuel consumption, last tank filling, tank contents or forward coverage of fuel requirement (based on past consumption rate). Simple operation with menu-guided instrument settings.

Electronic measurement ensures high accuracy. Standard tank sizes

are memorized and accessible.

Tank tables for special sizes can be pre-programmed (option).

Technical Specification

Functions

Selection facility for units to be displayed, total volume calculation, daily memorization of fuel levels, consumption check, graphic display of consumption over last year, 3 or 5 years, forward fuel coverage, alarm functions, sensor fault and short circuit indication.

Measuring range

0 to 300 mbar

Accuracy of measurement

± 1.5 % FSD

Operating temperature range

Medium: 0 °C/+60 °C
 Ambient: 0 °C/+45 °C
 Storage: -5 °C/+80 °C

Display

Graphic display (23 x 46 mm), back lit and high resolution (64 x 128 Pixel). Choice of display in litres, m³, % and liquid level in mm. Visual symbols for alarm information.

Submersible probe

Housing: stainless 1.4305
 Cable: PVC, 5 m with breather tube
 Membrane: stainless 1.4435
 Seals: FKM
 Spacer: POM, PE

Supply voltage

AC 230 V

Lithium battery for calendar memory function.

Relay output

Relay contact: 1x voltage-free change-over

Contact rating: 2 A, non-inductive

Audible alarm

Integrated piezo-buzzer, re-settable

Housing

Wall mounting housing, impact resistant plastic (ABS)
 W x H x D: 97 x 163 x 62 mm

Protection

IP 54 (EN 60529)

Scope of Supply

- Digital display unit with graphics
- Submersible probe with 5 m submersible cable
- Screw connector set G x G1½ x G2
- Mounting kit for withdrawal flange on plastic battery type tanks
- Weather-proof mains socket

Options

- Programming to special tank table

DG: H	Part no.	Price €
TankControl 01	52132	
Additional cost		
Special tank table programme		

Universal Hydrostatic Level Indicator TankControl 02



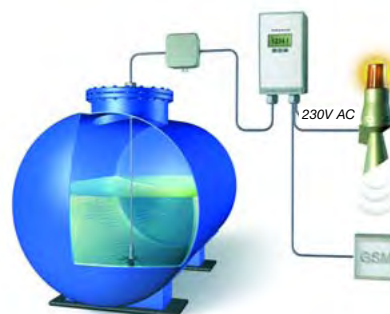
Display instrument



Submersible probe



TankControl 02



Probe right to bottom of tank

Application

Continuous reading level indicator with graphic display unit for consumption control, minimum or maximum level alarms as well as level control. Suitable for tanks from 1 to max. 4 m liquid height. Especially designed for modern housing technology. Remote indication up to 15 m.

Description

The hydrostatic level indicator system consists of a display instrument with graphics and a submersible probe with integrated pressure transducer. Choice of read-out in litres, m³, %, or liquid level in mm. When a pre-set, fully adjustable, min. or max. level is reached, a visual or audible alarm is initiated at the indicator. Additional relay contacts are provided for the connection of additional alarm units or for level control functions, telecommunication and housing technology control systems. The integrated microprocessor registers and memorizes measured values and enables the user to call up important information such as consumption, coverage of forward requirement (based on past consumption rate). Simple operation with menu-guided instrument settings. Electronic measurement ensures high accuracy. Standard tank sizes are memorized and can be accessed. Tank tables for special sizes can be pre-programmed (option). An additional float switch for high

level (for instance for slack water) can be connected.

Technical Specification

Functions

Selection facility for units to be displayed, total volume calculation, daily memorization of fuel levels, consumption check, graphic display of consumption over last year, 3 or 5 years, coverage of forward requirement, alarm and level control functions, sensor fault and short circuit indication.

Measuring range

0 to 400 mbar

Accuracy of measurement

± 1.5 % FSD

Operating temperature range

Medium: 0 °C/+60 °C

Ambient: 0 °C/+45 °C

Storage: -5 °C/+80 °C

Display

Graphic display (23 x 46 mm), back lit and high resolution (64 x 128 Pixel). Choice of display in litres, m³, % and liquid level in mm. Visual symbols for alarm information.

Submersible probe

Housing stainless 1.4305
Cable PVC, 6 m with breather tube

Membrane stainless 1.4435
Seals FKM
Spacer POM, PE

Supply voltage

AC 230 V

Lithium battery for calendar memory function.

Relay output

Relay contacts: 2 x voltage-free change-over

Contact rating: 2 A, non-inductive

Housing

Wall mounting housing, impact resistant plastic (ABS)
W x H x D: 97 x 163 x 62 mm

Protection

IP 54 (EN 60529)

Scope of Supply

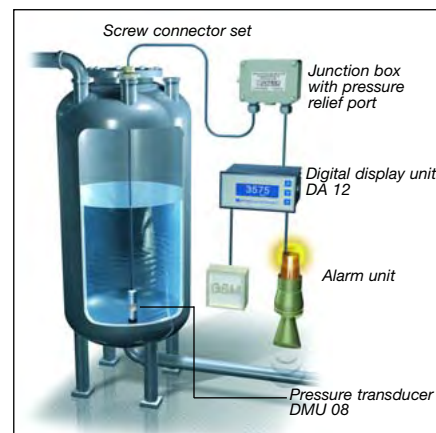
- Digital display unit with graphics
- Submersible probe with 6 m submersible cable
- Screw connector set G x G1½ x G2
- Mounting kit for 15 mm diam.hole (PG9 cable gland)
- Weather-proof mains socket

Options

- Programming to special tank table
- Additional float switch

DG: H	Part no.	Price €
TankControl 02	52134	
Additional cost		
Special tank table programme		

Hydrostatic level measurement pressure transducer DMU 08



Application

Continuous electronic level measurement in tanks, wells, drilling holes, water reservoirs and rivers or waste water systems.

Description

The DMU 08 pressure transducers use silicon technology and feature calibrated, amplified sensor signals which are converted into standardised voltage or current outputs.

Features:

- Compact and robust stainless steel design
- Choice of PUR or FEP cable
- Special calibration for all standard pressure units
- Integrated voltage overload protection according to EN 61000-4-5

Accuracy of measurement

Deviation according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability):
 $< \pm 0.35 \% \text{ FSD}$
 (measuring ranges 0/100 mbar to 0/400 mbar $< \pm 0.5 \% \text{ FSD}$)

Measuring ranges

0/100 mbar to 0/40 bar, relative pressure

Overpressure safety

Min. 2 x FS
 (burst pressure min. 3 x FS)

Operating temperature range

Medium: $-10^{\circ}\text{C}/+70^{\circ}\text{C}$
 Ambient: $-10^{\circ}\text{C}/+70^{\circ}\text{C}$
 Storage: $-25^{\circ}\text{C}/+70^{\circ}\text{C}$

Temperature error band

in compensated range
 $0-70^{\circ}\text{C} \leq 1 \% \text{ FSO}$
 $(\leq 0.25 \text{ bar} \leq 2 \% \text{ FSO})$

Dynamic characteristics

Response time $< 10 \text{ ms}$

Materials

Housing stainless steel 1.4571
 Diaphragm stainless steel 1.4404
 Seals FKM (Viton)

Pressure transmission liquid

Silicone oil

Supply voltage

DC 12-36 V
 Ex version DC 14-28 V

Output signal

4-20 mA, 2-wire

Load

$4-20 \text{ mA} \leq \frac{U_B (V) - 12 \text{ V}}{0.02 \text{ A}} [\text{Ohm}]$

Current input

4-20 mA $< 25 \text{ mA}$

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

PUR cable (IP 68)

CE conformity (EMC)

EN 61326

Accessories (optional)

- Screw connector set
- Junction box
- Lightning protection
- Fixing clamp
- Extended weight

Optional extras

- Ex version (II 1/2 G EEx ia IIC T4)
- FEP cable
- Higher operating temperature ranges

DG: H	Part no.	Price €
DMU 08 with 5 m PUR cable		
Measuring range		
0/100 mbar	31555	
0/160 mbar	31556	
0/200 mbar	31557	
0/250 mbar	31558	
0/300 mbar	31519	
Plastic screw connector set, G2 x 1 1/2 x 1	52125	
Junction box with pressure relief port	31824	

Refer to pages 415 to 449
 for the complete range of
 „Pressure Transducer“

Digital display units DA 10/12/14



- 5-digit graphical LCD display
- Text-based user interface
- Linearisation for volume indication (24 points)
- Selectable units
- Universal power supply unit
- Integrated supply voltage for transducer
- Relay outputs (DA 12/14)

Description

Digital display unit (DA 10) also available with additional relay output (DA 12/14) for electronic transducers.

Technical specifications

Display

5-digit graphical LCD display, backlit (white), text based user interface, choice of interface language (German/English/French), selectable units of measurement.

Measuring range

±99,999 digits (min. and max. values scalable)

Linearity

±0.1 % of measuring range

Resolution

Decimal point position as required

Response time

< 0.2 s

Operating temperature range

Ambient: -10 °C/+55 °C

Supply voltage

AC/DC 20-253 V

Sensor supply

Integrated, galvanically isolated power supply for transducer:
DC 20 V/20 mA

Sensor input

All analogue standard signals, e.g. 4-20 mA, 0-20 mA, 0-1 V, 0-10 V

Analogue output

0/4-20 mA, galvanically isolated

Housing

Standard housing for panel mounting
W x H x D: 96 x 48 x 135 mm

Panel cut-out

W x H: 92 x 45 mm

Protection (front)

IP 65 (EN 60529)

Electrical connection

Plug-in screw terminals (1.5 mm²)

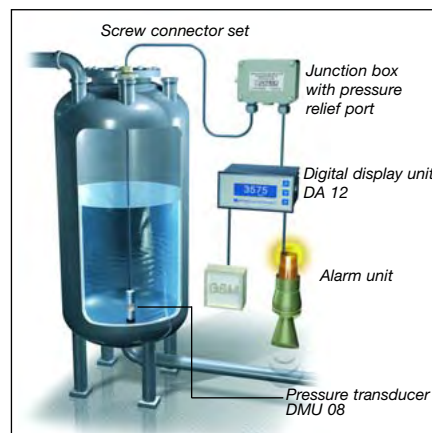
Linearisation

Customer-specific linearisation with a max. of 24 points for the indication of volume (e.g. litres) in non-linear tanks. Dip charts for cylindrical, vertical and spherical tanks are stored.

Min./max. value memory

Stores and indicates the highest and lowest values attained during operation.

Refer to pages 503 to 505 for the complete „Digital Display Units“ range.



Additional functions DA 12

Analogue output 2

0-10 V, galvanically isolated

Relay outputs

Relay contacts: 2 voltage-free changeover contacts (adjustable hysteresis) Contact rating: AC 250 V, 2 A, 100 VA

Additional function DA 14

Analogue output 2

0-10 V, galvanically isolated

Relay outputs

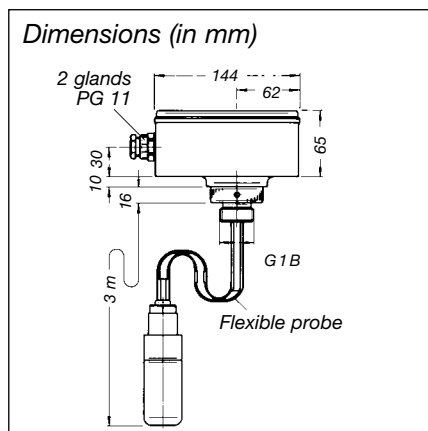
Relay contacts: 4 voltage-free changeover contacts (adjustable hysteresis) Contact rating: AC 250 V, 2A, 100 VA

DG: H	Part no.	Price €
DA 10	31281	
DA 12	31282	
DA 14	31283	
Wall-mounted housing WAG 01 for mounting of one DA*	31287	
WAG 02 for mounting of two DAs*	31288	
WAG 03 for mounting of three DAs*	31289	
WAG 04 for mounting of four DAs*	31290	

* Price includes mounting if DA and WAG are ordered together.

Compact capacitance level indicator

CapFox® EFT 7



Application

Capacitance level indicator for continuous measurement of levels in tanks and containers with filling heights of 200 mm to 3,000 mm. Suitable for non-conducting liquids, especially fuel oil or diesel.

Description

EFT 7 capacitance level indicator forms with its associated probe a single compact unit.

The unit is available with either a flexible band electrode or a rigid rod probe.

The flexible band electrode can be used for liquid levels from a minimum of 1,150 mm to a maximum of 3,000 mm.

The rod probe version with concentric screen tube is used for applications involving small containers with heights or diameters 200 mm to 1,500 mm. Please specify the length of the rigid rod probe when ordering.

Zero and full scale can be adjusted via an internal potentiometer.

The output signals are proportional to the filling level.

Technical specifications

Measuring range

0/200 mm to 0/3,000 mm, depending on selected probe

Accuracy of measurement

±2 % FSD

Operating temperature range

-20 °C/+50 °C

Process pressure

no pressure

Process connection

Aluminium

Flexible band electrode G1B

Rod probe G1½B

Flexible band electrode

3,000 mm long flexible band electrode (can be shortened to 1,150 mm) with plastic probe weight

Rod probe

Electrode stainless steel 1.4571

Concentric screen tube, steel

Required probe length must be specified with order

Minimum length 200 mm

Maximum length 1,500 mm

Supply voltage

AC 230 V or DC 24 V or AC 24 V

Power consumption

AC 3 VA/DC 2 W

Output signals (load)

4-20 mA (max. 500 Ohm)

0-10 V (min. 10 kOhm)

corresponds to measuring range 0/100 %

Capacitance range

0-200 pF

Housing

Wall mounting housing made of impact resistant plastic (ABS)

W x H x D: 104 x 65 x 144 mm

Protection

IP 65 (EN 60529)

Electrical connections

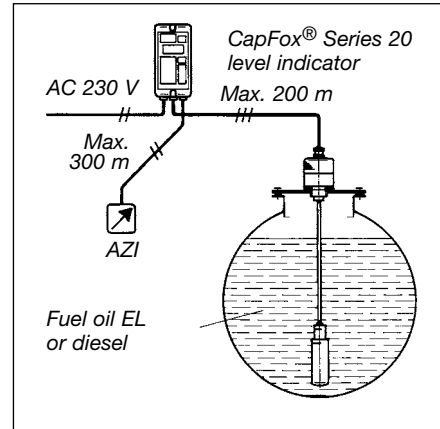
2 x cable gland PG 11

Options/accessories

- Flexible band electrode 6,000 mm
- Analogue indicators (refer to page 26).
- Digital display units with and without switching function (refer to pages 503 to 505).

DG: E	Part no.	Price €
EFT 7 with flexible band electrode 3 m	52107	
EFT 7 with rigid rod probe Please specify length!	52108	

Capacitance level indicator CapFox® Series 20



Application

For continuous level measurement in tanks containing fuel oil EL, L or diesel. Specially suitable for underground tanks and basement tanks. For filling levels from 1,200 mm to 3,000 mm.

Description

The capacitance level indicator consists of the CapFox® Series 20 evaluation unit with digital display and a flexible band electrode with an integrated pre-amplifier. The evaluation unit and probe must be ordered separately.

The maximum distance between the probe and the evaluation unit is 200 m. The flexible band electrode is factory fitted with a 1.5 m connection cable. It can be extended by means of a 3-wire screened cable with a cross-section of min. 0.5 mm².

The level is indicated in percentage of height. Additional indicator units AZI for panel mounting are available. The AZI can be fitted with a litre scale.

A 0 -1mA output signal is provided. Additional switching functions can be provided by connecting the MK 101 GB trip amplifier with relay output.

Technical specifications

Measuring range

0/1,200 mm to 0/3,000 mm

Accuracy of measurement

±2.5 % FSD

Operating temperature range

-10 °C/+50 °C

Process pressure

no pressure

Display

3½ digit LC display
Resolution 0.1 % (±1 digit)

Displayed units

0-100 % liquid level

Process connection

G1B

Probe head

Aluminium, 50 x 95 mm (Ø x L)
Protection IP 68 (EN 60529)

Flexible band electrode

3,000 mm long flexible band electrode (can be shortened to 1,200 mm) with plastic probe weight

Supply voltage

AC 230 V or DC 24 V

Power consumption

3 VA

Output (load)

0-1 mA (max. 1.5 kOhm)

Housing

Wall mounting housing with plug-in base, impact resistant plastic (ABS)
W x H x D: 76 x 150 x 115 mm

Protection

IP 30 (EN 60529)

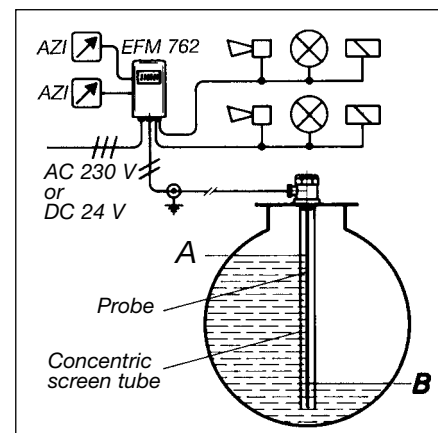
Accessories (optional)

- Analogue indicators for panel mounting with 0-100 % scale
- Additional litre scale (please provide exact tank dimensions and capacity when ordering)
- Trip amplifier with relay output

DG: H	Part no.	Price €
Series 20 evaluation unit	54100	
Flexible band electrode	54010	
Accessories		
Additional indicator unit AZI 96 0-1 mA	57102	
Additional litre scale AZI 96	57999	
Additional indicator AZI 144 0-1 mA	57103	
Trip amplifier MK 101 GB 1 x voltage-free changeover contact	54110	

Capacitance level indicators

CapFox® EFM 741/752/762



Application

For continuous level measurement in containers, silos, tanks or filling systems.

Suitable for liquid, powdery, electrically conducting or non-conducting media.

Also suitable for pressurised or vacuum tanks.

Description

The capacitance level indicator consists of a series CapFox® EFM evaluation unit with digital display, a probe and a pre-amplifier which is factory fitted in the probe head. CapFox® EFM 741 provides only indication.

CapFox® EFM 752 indication plus one limit switch. The fully adjustable limit switch for a min. or max. signal, with variable hysteresis, can be used for control functions (voltage-free relay contact).

CapFox® EFM 762 has two independently adjustable limit switches to control filling/emptying processes.

The choice of probe (partly or fully insulated, rigid or flexible) depends on the properties of the material to be measured and the shape of the tank. Fully insulated probes must be used for conducting media. The probes are equipped with a capacitance voltage transducer (HF probe insert) in the probe head and are mounted vertically.

Technical specifications

Measuring range

0/200 mm to 0/12,000 mm, depending on selected probe

Accuracy of measurement

±2 % FSD

Operating temperature range

Ambient: -10 °C/+50 °C

Process pressure

Depending on selected probe

Display

3½ digit LCD display
Resolution 0.1 % (±1 digit)

Displayed units

0-100 % liquid level

Supply voltage

AC 230 V or DC 24 V

Power consumption

5 VA

Output signals

0-10 V/4-20 mA

Relay outputs (relay contacts)

EFM 741 None
EFM 752 1 x voltage-free changeover contact
EFM 762 2 x voltage-free changeover contacts

Switch rating

AC 250 V 3 A
DC 24 V 0.5 A

Visual indication (752/762)

Green LED normal operation
Red LED alarm condition
Switch point indication

Fail-safe mode (752/762)

Integrated selector switch for min. or max. fail-safe mode (low/high)

Housing

Wall mounting housing with plug-in base, impact resistant plastic (ABS)
W x H x D: 76 x 150 x 115 mm

Protection

IP 30 (EN 60529)

Ordering information

Complete measuring system EFM series (items to be ordered separately):

- Evaluation unit EFM
- HF probe insert type 3640 211
- Probe
- Concentric screen tube (not required with flexible band electrode since the earth electrode is already integrated)

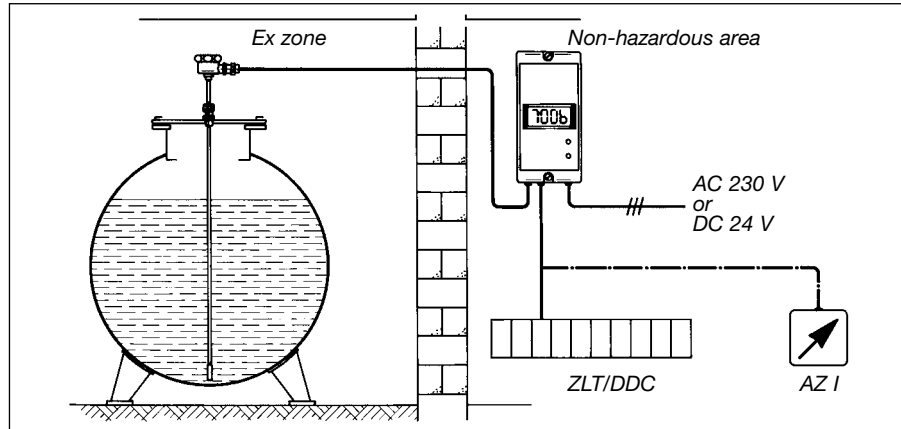
Refer to pages 29, 30 for probes and pre-amplifiers.

Select according to the operating conditions. Special customer-specific probes are available in addition to the standard probes.

DG: E	Part no.	Price €
EFM 741	51741	
EFM 752	51752	
EFM 762	51762	

Capacitance level indicator with Ex approval

CapFox® S 74x



Application

For continuous level measurement in tanks and vessels in Ex zones 0, 1 and 2.

Suitable for liquids, powders, electrically conducting or non-conducting media. Also suitable for pressurised or vacuum tanks.

Description

The capacitance level indicator consists of a series CapFox® S 74x evaluation unit with digital display, a probe and an Ex pre-amplifier which is factory fitted in the probe head.

CapFox® S 74x has an intrinsically safe probe circuit. In order to guarantee the intrinsic safety of the circuit, the S 74x evaluation unit may only be used in conjunction with a type Ex 3640 021HF pre-amplifier and a rigid series 88 capacitance probe. The evaluation unit must be installed outside of the hazardous area.

The choice of probe (partly or fully insulated, rigid) depends on the properties of the material to be measured and the shape of the tank. Fully insulated probes must be used for conducting media. The probes are equipped with a capacitance voltage transducer (HF probe insert) in the probe head and are mounted vertically.

Technical specifications

Measuring range

0/200 mm to 0/3,000 mm, depending on selected probe

Accuracy of measurement

±1.5 % FSD

Operating temperature range

Ambient: -10 °C/+50 °C

Process pressure

Depending on selected probe

Display

3½ digit LCD display
Resolution 0.1 % (±1 digit)

Displayed units

0-100 % liquid level

Supply voltage

AC 230 V

Power consumption

5 VA

Outputs

0-10 V/0-1 mA/4-20 mA

Visual indication

Yellow LED power „on“

Intrinsically safe circuit

$U_M = 250 \text{ V}$, $U_O = 13.0 \text{ V}$, $I_O = 76 \text{ mA}$
 $P_O = 0.25 \text{ W}$, $C_O = 1.0 \text{ }\mu\text{F}$, $L_O = 6.1 \text{ mH}$

Housing

Wall mounting housing with plug-in base, impact resistant plastic (ABS)
W x H x D: 76 x 150 x 115 mm

Protection

IP 30 (EN 60529)

Ex approval

EEx II C (EEx ia) II C T6
BASEFA No. 96D2392

HF pre-amplifier Ex

HF pre-amplifier insert Ex type 3640 021 exclusively for the CapFox® S 74x to ensure the intrinsic safety of the circuit. The pre-amplifier is factory fitted in the probe head.

Ordering information

Complete measuring system (items to be ordered separately):

- Evaluation unit S 74x
- HF probe insert type 3640 021
- Rigid series 88 probe
- Concentric screen tube

Refer to pages 29, 30 for probes. Select according to the operating conditions. Special customer-specific probes are available in addition to the standard probes.

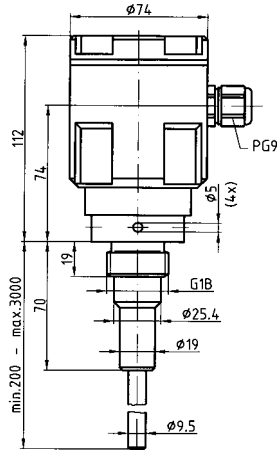
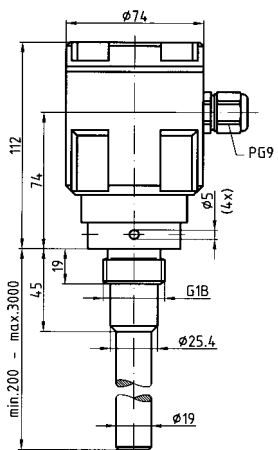
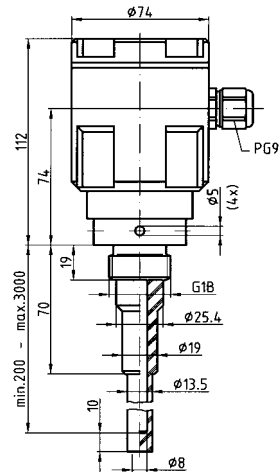
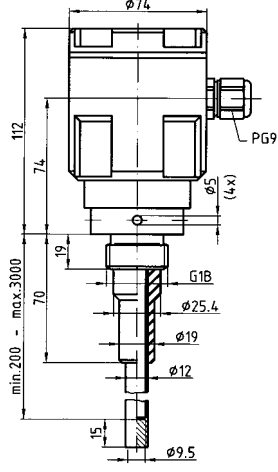
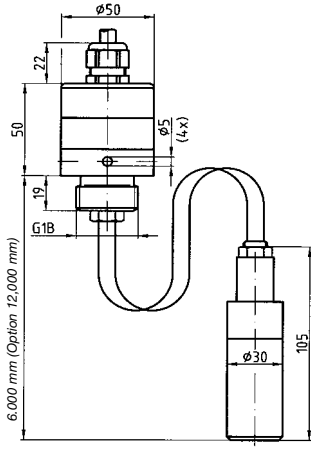
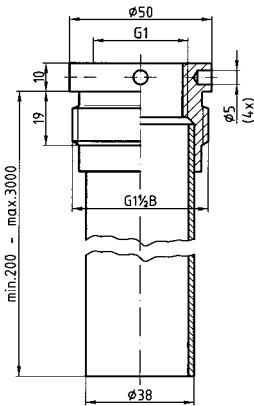
Options

- Supply voltage DC 24 V

DG: E	Part no.	Price €
S 74x AC 230 V	51745	
S 74x DC 24 V	51746	
HF-pre- amplifier Ex	51791	

Probes for capacitance level indicators

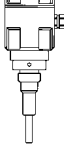
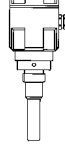
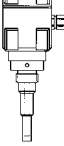
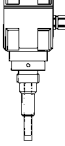
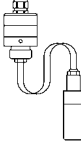
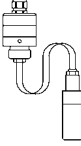
Types and dimensions (in mm)

<i>Rod probe CNS 01 PTFE partly insulated</i> 	<i>Rod probe CNS 02 heavy duty version PTFE partly insulated</i> 
<i>Rod probe CNS 03 PP fully insulated</i> 	<i>Rod probe CNS 04 PTFE fully insulated</i> 
<i>Band electrode CNS 05 F</i> 	<i>Concentric screen tube</i> 

Many other special probe versions are available. Please enquire. Refer to page 30 for Part no.

Probes for capacitance level indicators

DG: E

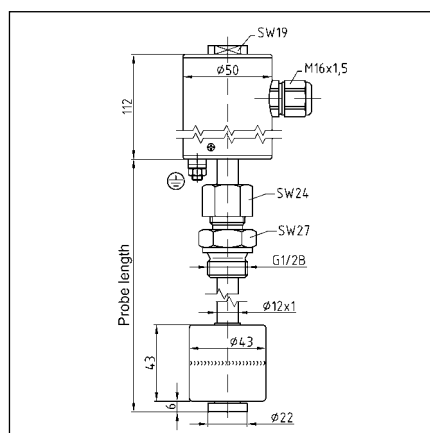
Type	CNS 01 <i>Rod probe</i>	CNS 02 <i>Rod probe</i>	CNS 03 PP <i>Rod probe</i>	CNS 04 PTFE <i>Rod probe</i>	CNS 05 F <i>Flexible band electrode</i>	CNS 05 F <i>Flexible band electrode</i>
Version						
Type number	8812-21-3000	8812-22-3000	8812-61-3300	8812-81-3300	8022-56-000	8022-56-000
Suitable for	EFM/S74x	EFM/S74x	EFM/S74x	EFM/S74x	EFM	EFM
Price €					55552	55553
Part no.	55509	55510	55520	55532		
Probe head						
Material	Aluminium die cast	Aluminium die cast	Aluminium die cast	Aluminium die cast	Aluminium	Aluminium
Electrical connection	PG 9	PG 9	PG 9	PG 9	2 m fixed cable	2 m fixed cable
Protection	IP 66	IP 66	IP 66	IP 66	IP 68	IP 68
Process connection	G1B (G1 ¹ / ₂ B)**	G1B (G1 ¹ / ₂ B)**	G1B (G1 ¹ / ₂ B)**	G1B (G1 ¹ / ₂ B)**	G1B	G1B
Electrodes						
Material	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571	Copper	Copper
Insulation	PTFE partly insulated	PTFE partly insulated	PP fully insulated	PTFE fully insulated	PE partly insulated	PE partly insulated
Diameter	9.5 mm	19 mm	13.5 mm	12 mm	2 x 0.5 mm	2 x 0.5 mm
Length*	up to 1,000 mm	up to 1,000 mm	up to 1,000 mm	up to 1,000 mm	6,000 mm can be shortened	12,000 mm can be shortened
Application area						
Process pressure	-1/+20 bar	-1/+20 bar	0/20 bar	0/5 bar	no pressure	no pressure
Temperature of medium	-20/+220 °C	-20/+220 °C	20 bar: 50 °C 10 bar: 100 °C	5 bar: 50 °C 3 bar: 150 °C	-20/+50 °C	-20/+50 °C
Additional costs						
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
HF-probe insert	51790	51790	51790	51790	Standard	Standard
HF-probe insert Ex	51791	51791	51791	51791	---	---
Probe extension per m (max. 3,000 mm)*					---	---
Screen tube steel up to 3,000 mm*	55555	55555	55555	55555	---	---
Screen tube stainless steel 1.4571 up to 1,000 mm*	55557	55557	55557	55557	---	---
Extension screen tube stainless steel per m (max. 3,000 mm)*					---	---

* Please specify exact probe length.

** If a concentric screen tube is used, the process connection changes to G1¹/₂B.

Many other probe versions are available. Please enquire.

Magnetostrictive Level Indicator MagFox MMG 01



Application

High accuracy continuous level indicator for tanks and vessels from 200 mm to 4,000 mm in height. Suitable for non-crystallising low viscosity liquids which do not adhere to the sensing probe.

Description

MagFox works on the magnetostrictive principle. A magnetostrictive wire is integrated in the tubular sensing probe.

The microprocessor controlled sensor electronics generate electromagnetic pulses which pass through the wire and create a circular magnetic field. The float of the probe contains a magnet which magnetises the wire at the float's position. At the point where the two magnetic fields meet a torsion wave is created which then passes back up along the wire to the probe head. The time of flight of the pulse is measured and processed by the electronics of the unit.

Technical Specifications

Measuring range

0/200 mm to 0/4,000 mm

Accuracy of measurement

± 0.25 mm

Resolution < 0.1 mm

Operating temperature range

Ambient: -40 °C/ +85 °C

Medium: -40 °C/+125 °C

Operating pressure

Max. 16 bar

Process connection

Stainless steel 1.4571

Screw-in connector G1/2B, height adjustable

Probe

Stainless steel 1.4571, Ø 12 mm
probe length 1,000 mm (min. length 200 mm – max. length 4,000 mm)

Float

For liquids 0.70 g/cm³
Stainless steel 1.4571, PN 16,
cylindrical 43 x 43 mm (Ø x H)

Supply voltage

DC 10-30 V

Output signal

4-20mA, 2-wire transmitter

Housing

Robust field mounting enclosure with screw type lid.
Stainless steel 1.4305

Protection

IP 68 (EN 60529)

Electrical Connections

Cable gland M16 x 1.5

Optional Versions

- Ex approved type
- Other process connections
- Other probe materials
- Other floats
- Higher operating temperature
- HART Protocol

Special MagFox features:

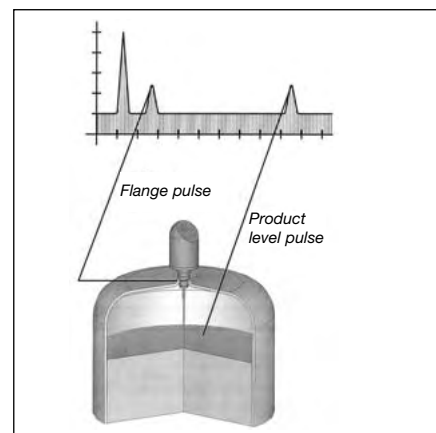
- Accuracy of measurement better than ± 0.25 mm
- Robust design ensures long life expectancy
- Insensitive to shocks and vibration
- Easy to install and easy to commission
- Fully adjustable measuring range over full length of probe
- Microprocessor controlled evaluation of measurement
- Temperature compensated measuring principle
- Very short measuring intervals
- ATEX Approval for Zone 0 (optional)
- HART Protocol (optional)

DG: E

Version	Part no.	Price €
MMG 01 200 -1,000 mm Please state Probe length !	53510	
Additional cost		
Probe extension per 100 mm		
Process connection R 1 1/2, brass		
Ex-Approval (II 1/2 G EEx ia IIC)		
Higher Temperature Range (of medium) -200 °C/+250 °C		

Guided micropulse level measuring systems

PulsFox® Technical information/product selection



Principle of operation

PulsFox® PMG 01 level measuring systems operate on the basis of the TDR principle (time domain reflectometry). This principle uses a probe as a micropulse guide.

Electromagnetic pulses are emitted at the speed of light, reflected by the surface of the medium to be measured and received by the signal converter.

Since the speed of light is constant and independent of the gas composition in the tank, the PMG devices do not require commissioning.

The units do not have any moving parts, thus being almost maintenance-free.

Changes of the medium do not affect the measuring accuracy of the TDR principle.

The pulse's propagation time is directly proportional to the distance between the probe and the surface of the medium.

Applications

Guided Micropulse devices are used to measure levels and interfaces of liquids, granular materials and powders.

Features

- The measurement is unaffected by changes in dielectric constant, pressure, temperature or density.
- Foam, steam, dust or a turbulent surface of the medium do not affect the accuracy of the measurement.
- No recalibration is required when a different medium is used.
- A great number of different materials and process connections are available and render the system suitable for use with corrosive media or, for example, in the food industry.

Probe selection

Rigid/flexible monoprobe type F/E	Flexible probes type B	KOAX probe type C
Typical application areas:		
➤ Cement, limestone, aluminium ➤ Highly viscous liquids ➤ Plastic powder, e.g. PVC ➤ Granular plastic materials	➤ Granular plastic materials ➤ Light powders with low dielectric constant ➤ Alcohols ➤ Water supply tanks	➤ Tank height ≤ 6 m ➤ Solvents, NH₃, foam, alcohol, oil/water, separators
Recommended for the following applications:		
➤ An existing stilling well can be used to create a coax version (calibration required) ➤ FEP coating for crystallising products ➤ Application with conducting foams	For high silos or tanks with liquids, granular materials ➤ Flexible sensors up to 24 m ➤ For smaller tanks with little headroom	Only for level measurement in clean liquids ➤ In turbulent or flowing liquids the sensor acts like a stilling well ➤ Liquid or steam jet in vicinity of probe ➤ Can be in contact with metal or tank wall ➤ For very low dielectric constants
Do not use:		
➤ For small socket diameters (< DN 100) ➤ For high socket	➤ Turbulent liquids where probe cannot be anchored ➤ Product temperature > 240 °C	➤ Crystallising liquids ➤ Liquids containing solid matter ➤ Products tending to adhere ➤ Powders ➤ Viscous liquids (e.g. crude oil)

Guided micropulse level measuring system

PulsFox® PMG 01

PMG 01 with rigid monoprobe



PMG 01 with flexible monoprobe



Application

For continuous level measurement in containers, tanks or silos. Suitable for electrically conducting or non-conducting liquids and bulk materials. Also suitable for pressurised or vacuum tanks.

Description

PulsFox® level measuring systems operate on the basis of the TDR principle (time domain reflectometry). The measurement is unaffected by changes in dielectric constant, pressure, temperature or density. Foam, steam, dust or a turbulent surface of the medium do not affect the accuracy of the measurement. No recalibration is required when a different medium is used.

Technical specifications

Measuring range

B/E probe ≤ 24 m

C probe ≤ 6 m

F probe ≤ 3 m

Refer to probe type for probe version

Accuracy of measurement

Liquids:

$L < 15 \text{ m}$: ±5 mm

$L \geq 15 \text{ m}$: ±0.05 % of measured value

Powders/granular materials:

$L < 15 \text{ m}$: ±20 mm

$L \geq 15 \text{ m}$: ±0.05 % of measured value

Dielectric constant (ϵ_r)

Monoprobe ≥ 2.3

Dual probe ≥ 1.8

Coax probe ≥ 1.5

Operating temperature range

Medium: -30 °C/ +200 °C

Flange: -30 °C/ +90 °C

Ambient: -30 °C/ +60 °C

(Ex version
-30 °C/ +55 °C)

Process pressure

40 bar

Process connection

G1B

(for PMG 01 DF = G1^{1/2}B)

Probe type/probe material

F = rigid monoprobe

Stainless steel 1.4571

B / E = 1-2 flexible probe(s):

Stainless steel 1.4401 (Ø 4 mm)

C = coax probe:

Stainless steel 1.4571

Wetted parts:

Stainless steel 1.4571/1.4401,
PTFE, FPM

Supply voltage

DC 18-35 V

Ex version ≤ DC 28 V

Output signal

4-20 mA/HART, 2-wire

Housing

Aluminium die cast

Protection

IP 65 (EN 60529)

Electrical connection

Plug DIN 43650-A (IP 65)

CE conformity (EMC)

EN 50082-2, EN 50081-1

Accessories

Operating and configuration software

Options

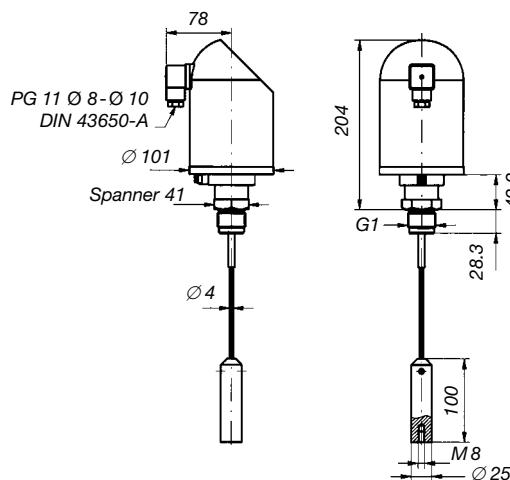
- Ex versions
- Other process connections
- Higher pressures
- Other probe diameters
- Higher flange temperatures
- FEP coatings
- Other seal materials
- Digital plug-in displays

Guided micropulse level measuring system

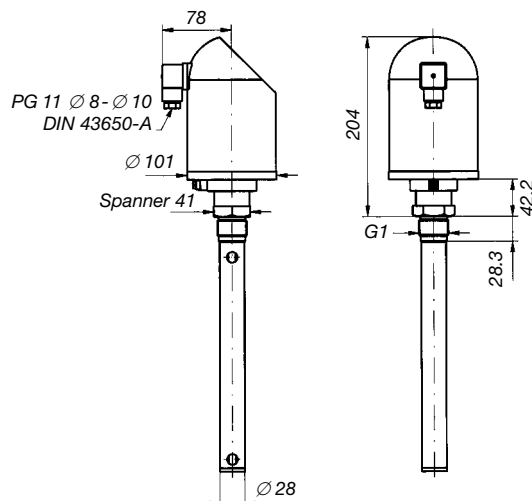
PulsFox® PMG 01 Types and dimensions (in mm)

Housing

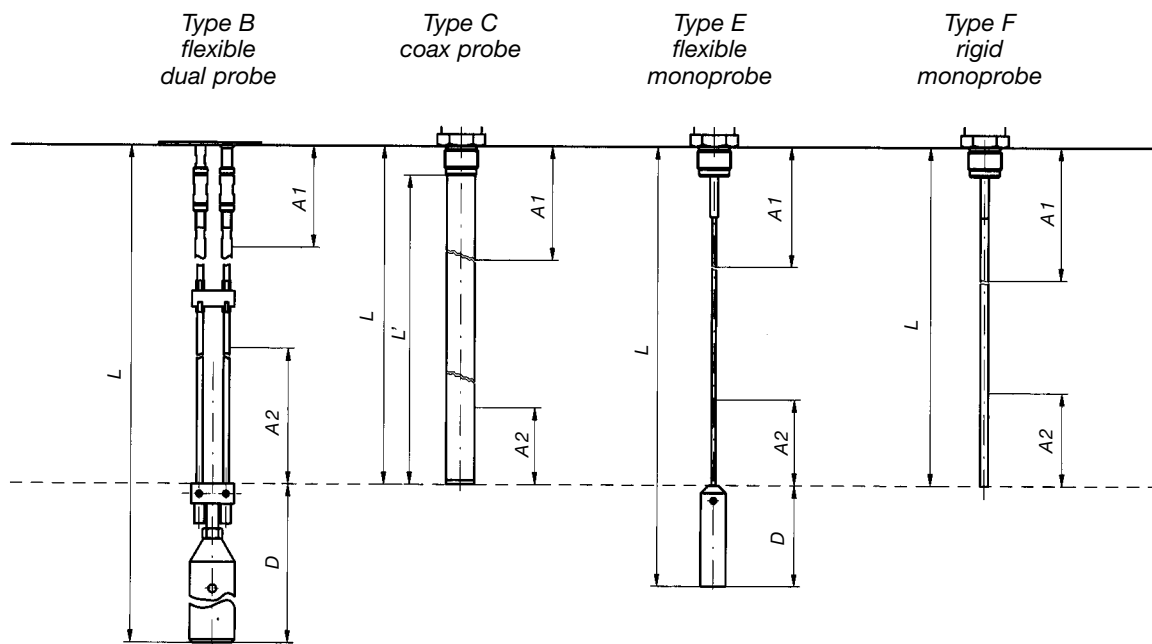
With flexible monoprobe and DIN plug



With coax probe and DIN plug



Probes



L = Length (**L'** = Length for coax with flange); **A1** = Upper blocking distance;
A2 = Lower blocking distance; **D** = range that cannot be measured

ϵ_r -value	Zone	Type B	Type C	Type E	Type F
80	A1	300 mm	0 mm	400 mm	400 mm
80	A2	20 mm	10 mm	20 mm	20 mm
2	A1	330 mm	0 mm	500 mm	500 mm
2	A2	100 mm	100 mm	200 mm	200 mm
–	D	80 mm	–	100 mm	–

Guided micropulse level measuring system

PulsFox® PMG 01

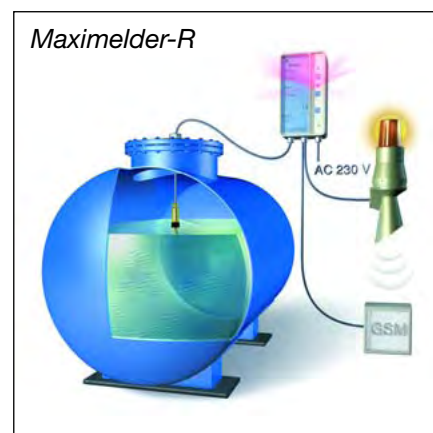
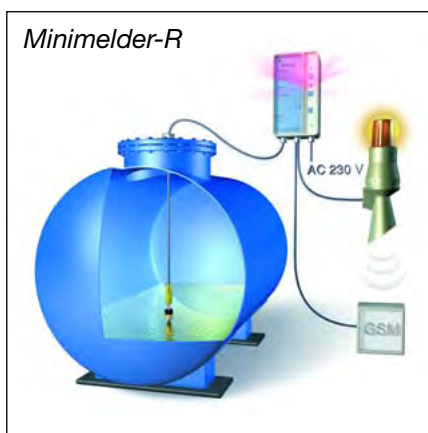
DG : H

Type	PMG 01 MS	PMG 01 MF	PMG 01 KX	PMG 01 DF
Version				
Probe type	Monoprobe, rigid	Monoprobe, flexible (Ø 4 mm)	Coax probe	Dual probe, flexible
Standard probe length	3 m (max. 3 m)	3 m (max. 24 m)	3 m (max. 6 m)	3 m (max. 24 m)
Accuracy of measurement	refer to data sheet	refer to data sheet	refer to data sheet	refer to data sheet
Max. flange temperature	up to 90 °C	up to 90 °C	up to 90 °C	up to 90 °C
Seal	FPM	FPM	FPM	FPM
Supply voltage	DC 18-35 V	DC 18-35 V	DC 18-35 V	DC 18-35 V
Output signal	4-20 mA/HART	4-20 mA/HART	4-20 mA/HART	4-20 mA/HART
System	2-wire	2-wire	2-wire	2-wire
Electrical connection	Plug DIN 43650	Plug DIN 43650	Plug DIN 43650	Plug DIN 43650
Basic price €				
Part no.	53468	53470	53472	53474
Additional costs €				
ATEX II 1 G IIC or IIB T6...T3				
ATEX II 1/2 D T100 °C (powder)				
Max. Ex flange temperature up to 200 °C				
Process connection				
G1B PN 40	Standard	Standard	Standard	---
G1½B PN 40	---	---	---	Standard
1" NPT PN 40				---
DIN and ANSI flanges	on request	on request	on request	on request
Clamp connection	on request	on request	on request	on request
Dairy fitting DIN 11851	on request	on request	on request	on request
Probe				
Probe extension per m	---			
Probe diameter 8 mm	---		---	---
Probe extension Ø 8 mm per m	---		---	---
FEP coating for probe length up to 3 m (only for probe diameter 4 mm)	---		---	---
FEP coating per m	---		---	---
Seal				
FFKM				
Accessories			Part no.	Price €
HART USB modem			53485	
Digital plug-in display DA 06			31278	
Digital plug-in display DA 06-Ex			31279	

* Process connection = G1½B, weight = Ø 40 x 260 mm

Level switches

Minimelder, Minimelder-R and Maximelder-R



Application

Designed to signal minimum or maximum levels of water, heating oil EL, L, M, oil/water mixtures and neutral, non-viscous and non-adhesive liquids in tanks.

Description

Mini-/Maximelder consists of a control unit and a height-adjustable float probe. The Minimelder probe is suspended in the lower part of the tank and generates an alarm signal when the liquid level drops below the probe. The Maximelder probe is mounted in the upper part of the tank and generates an alarm when the liquid reaches the probe. The switching level is adjustable. When these levels are reached, the units generate visual and audible alarms.

Minimelder

Generates an alarm signal when the level falls below the minimum level. Cost-effective solution for building automation applications. System owners are alerted to a low fuel oil level in time.

Only timely alarms allow you to respond to seasonal fuel oil price fluctuations in such a way as to reduce costs.

Minimelder-R

Similar to Minimelder, but with a relay (normally open contact) for transmission of the signal to external alarms or for connection to telecommunication or building control systems. For professional applications.

Maximelder-R

Generates an alarm when the level reaches the maximum set liquid level. In all other respects similar to Minimelder-R.

Technical specifications

Permitted media

- Water
- Fuel oil EL, L, M
- Oil/water mixtures
- Non-viscous and non-adhesive liquids

Operating temperature range

Medium: -5 °C/+50 °C
Ambient: -5 °C/+55 °C

Process connection

Plastic screw connection G1, with cable gland for height adjustment

Probe

Magnetic float switch

Dimensions: 85 x 24 mm (L x Ø)
Float: Plastic (PA/PP)
Cable: 5 m oil-resistant cable 2 x 0.5 mm²
Weight: brass
Protection: IP 68 (EN 60529)
Probe voltage: Max. AC 17 V

Connection probe - control unit

Max. length: 50 m (screened)

Supply voltage (control unit)

AC 230 V

Power consumption

5 VA

Relay output

Minimelder-R and Maximelder-R:
Relay contact: 1 voltage-free contact, normally open
Contact rating: AC 250 V, 2 A

Visual indication

1 green LED (power „on“)
1 red LED (alarm)

Audible alarm

Integrated piezo-buzzer, with re-set

Operational test

By means of test button

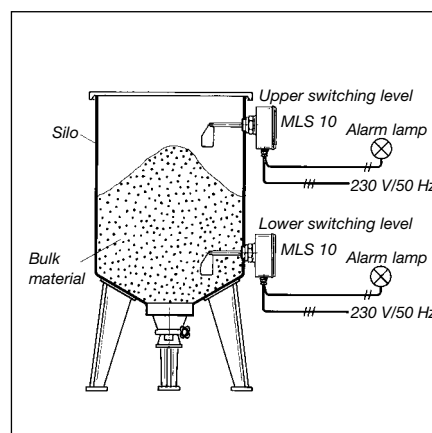
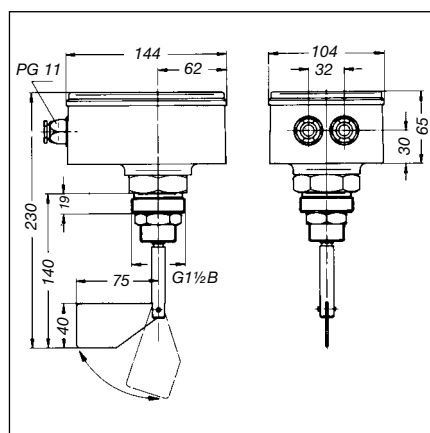
Housing

Wall mounting housing made from impact resistant plastic (ABS)
W x H x D: 97 x 163 x 62 mm
Protection: IP 30 (EN 60529)

DG: G	PU	Part no.	Price €
Minimelder	1	16700	
Minimelder-R	1	16701	
Maximelder-R	1	16702	
Spare probe for Minimelder	1	16703	
Spare probe for Maximelder	1	16704	

Compact rotary paddle switch

RotaFox® MLS 10



Application

The rotary paddle switch is used for detecting levels of bulk solids with a minimum bulk density of 100 g/dm³. Designed for use in silos and bins.

Description

The RotaFox® MLS 10 rotary paddle switch is a universal level switch. The sensor and the switching device form a single unit. The rotary paddle is driven by a synchronous motor via a reduction gear. When the free rotation of the paddle is impeded by material covering the paddle, a microswitch operates to generate an alarm switching signal. Power to the motor is then disconnected by a second microswitch.

RotaFox® MLS 10 features a voltage-free contact which switches when the limit value is reached. The contact transmits the signal to external devices, such as electric flaps or sliders, pumps, visual or audible alarm units (e.g. alarm lamp or horn).

When the level drops the paddle is released and the motor will re-start again and rotate the paddle.

Technical specifications

Minimum density of medium
100 g/dm³

Operating temperature range
Switching unit: -20 °C/+60 °C
Rotary paddle: -20 °C/+80 °C

Process pressure
0/0.5 bar

Process connection
G1½B

Paddle shaft
Stainless steel 1.4305,
including dust seal
Length 140 mm

Rotations of paddle
5 rpm

Load on the rotary paddle
Max. 250 N on the shaft (lateral)
Max. 120 N on the shaft tip

Mechanical service life
500,000 switchings

Supply voltage
AC 230 V

Power consumption
3.5 VA

Relay output
Microswitch: 1 voltage-free
changeover contact
Contact rating: AC 250 V 4 A
(resistive load)

Response delay
approx. 1 s

Housing
Impact resistant plastic (ABS)
W x H x D: 104 x 65 x 144 mm

Protection
IP 55 (EN 60529)

Electrical connections
2 x cable gland PG 11

Options

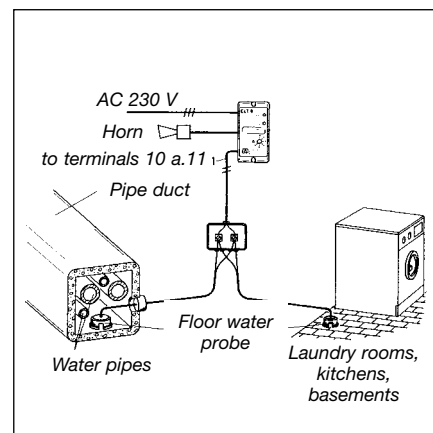
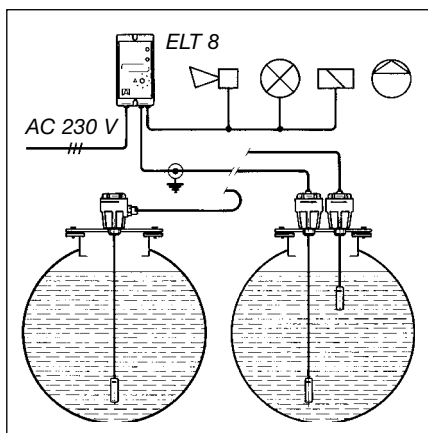
- Longer paddle shaft
(max. 1,000 mm)

DG: E

Version	Part no.	Price €
MLS 10 Paddle shaft 140 mm	56100	
MLS 10 Paddle shaft 500 mm	56116	
MLS 10 Paddle shaft 750 mm	56117	
MLS 10 Paddle shaft 1,000 mm	56118	

Conductivity level switch

CoFox® ELT 8



Application

Designed for use with electrically conducting liquids which do not foam excessively, are not highly viscous or adhesive (bridging), e.g. water, emulsions or waste water. Also suitable as a water alarm in conjunction with floor water probe BWS 11.

Description

The CoFox® ELT 8 level controller operates on the basis of conductivity. The following functions can be selected:

- Level switch
- Level control for filling
- Level control for emptying

The sensitivity is adjustable.

2 voltage-free changeover contacts are provided for switching functions. The units feature LED's for „normal“ operation and „alarm“.

Switching functions

Level switch

The built-in relay can be pre-set to either energise or de-energise when the probe is in contact with the liquid. Sensitivity must be adjusted according to the conductivity of the liquid.

Level control for filling

A minimum of 2 probe rods are required. Set internal switch to „max“ (H). The relay energises when the min. probe loses contact with the liquid. The relay de-energises when the liquid reaches the max. probe.

Level control for emptying

A minimum of 2 probe rods are required. Set internal switch to „min“ (L). The relay energises when max. and min. probes are in contact with the liquid. The relay de-energises when the min. probe loses contact with the liquid.

Technical specifications

Adjustment range

2.5 - 50 kOhm (400 - 20 µS)
Fully adjustable

Operating temperature range

Ambient: -10 °C/+60 °C

Supply voltage

AC 230 V

Power consumption

4 VA

Probe circuit

Max. AC 3 V

Relay outputs

Relay contact: 2 voltage-free changeover contacts
Contact rating: AC 250 V 500 VA
DC 12 V 1 A

Visual indication

Green LED normal operation
Red LED alarm condition

Fail-safe mode

Integrated selector for min. or max. fail-safe mode (low/high)

Housing

Wall mounting housing with plug-in base, impact resistant plastic (ABS)
W x H x D: 53 x 113 x 108 mm

Protection

IP 30 (EN 60529)

Options

- Supply voltage DC 24 V

Probes

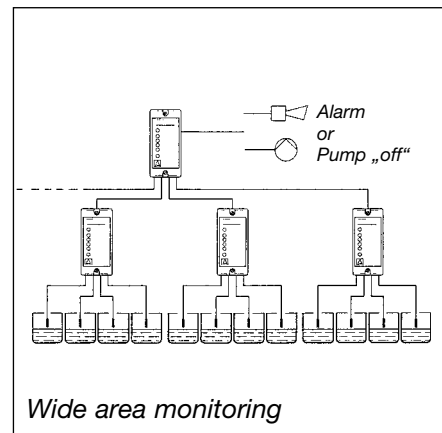
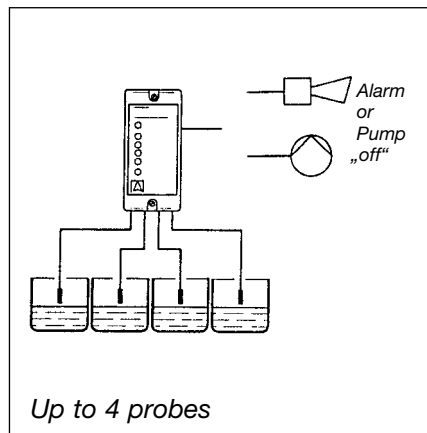
The probes are not included. Please order separately (refer to pages 43, 44)!

Select according to the operating conditions. Special customer-specific probes are available in addition to the standard probes.

Version	DG	Part no.	Price €
ELT 8 AC 230 V	E	53503	
ELT 8 DC 24 V	E	53503A	
Accessories:			
Alarm reset unit AQ 220	E	53230	
Combined visual and audible alarm unit	G	61020	
Cable extension fitting	G	40041	

Conductivity alarm unit

CoFox® ELT 500/4



Application

Designed for use with electrically conducting liquids which do not foam excessively and are not highly viscous or adhesive (bridging), e.g. water, emulsions or waste water.

The CoFox® ELT 500/4 alarm unit is suitable for use in large installations. Several zones (also large areas) can be monitored simultaneously with electrodes (probes) at various points.

Description

The CoFox® ELT 500/4 level controller operates on the basis of conductivity. The electrodes connected to the switching unit monitor the status at several points. When one or several electrodes are bridged, the red LED of the corresponding electrode circuit is switched on. For fast and precise location of the leak, a label is provided for each LED. A common voltage-free relay contact can be used to control separate alarm devices (e.g. alarm light or horn). The described function is only activated by electrode signals which are longer than 1 second in duration. The alarm is saved and cannot be reset for the duration of the electrode signal.

The alarm condition must be cleared before the alarm can be reset by pressing the reset button on the unit.

CoFox® ELT 500/4 can be used with a series of probes for large area monitoring with centralised control.

Refer to page 42 for additional application examples.

Technical specifications

Zone monitoring

4 input circuits

Switching threshold

50 kOhm

Operating temperature range

Ambient: -10 °C/+50 °C

Supply voltage

AC 230 V

Power consumption

3 VA

Probe circuit

Max. AC 3 V

Relay output

Relay contact: 1 voltage-free
changeover contact
Contact rating: AC 250 V 500 A

Visual indication

Yellow LED power „on“
4 red LEDs alarm condition

Housing

Wall mounting housing with plug-in base, impact resistant plastic (ABS)
W x H x D: 53 x 113 x 108 mm

Protection

IP 30 (EN 60529)

Probes

The probes are not included. Please order separately (refer to pages 43, 44)!

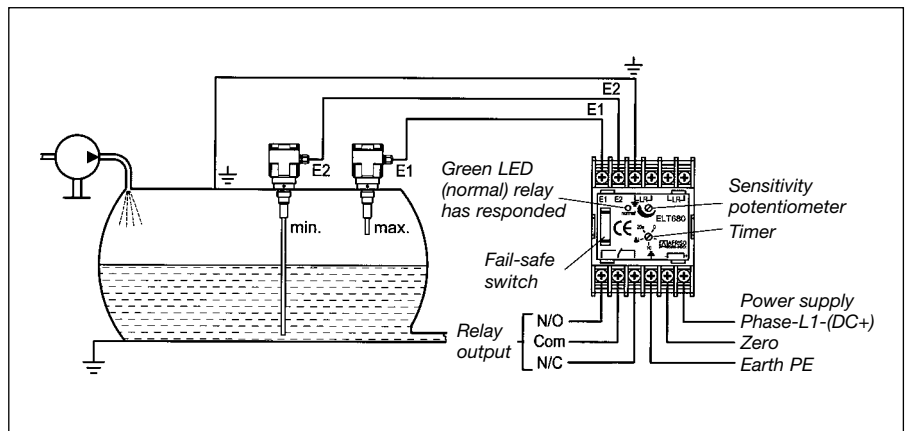
Select according to the operating conditions.

Special customer-specific probes are available in addition to the standard probes.

Version	DG	Part no.	Price €
ELT 500/4 AC 230 V	E	53505	
Accessories:			
Alarm reset unit AQ 220	E	53230	
Combined visual and audible alarm unit	G	61020	
Cable extension fitting	G	40041	

Conductivity level switch

CoFox® ELT 680



Application

Suitable for use with electrically conducting materials, predominantly liquids, e.g. milk, wine, fruit juices, waste water or lyes. Also suitable for foaming or adhesive media, e.g. beer or yoghurt. Specially designed for applications in the food industry.

Description

The CoFox® ELT 680 level controller operates on the basis of conductivity.

The built-in timer can be set to avoid undesired switching as a result of surface turbulences.

The sensitivity and adjustment range of the controller have been designed to ignore bridging resistances which could impair the reliability of the unit (e.g. foam across the electrode insulators in breweries, dairies and ice-cream plants).

Furthermore, the unit is capable of interface detection between liquids with different levels of conductivity (e.g. water and milk) in pipes and tanks.

Switching functions

The unit can be used with either one electrode as a single point controller or with two electrodes for pump „on-off“ control.

Technical specifications

Adjustment range

Variable adjustment
 Range HR 1 kOhm to 100 kOhm
 Range LR 50 Ohm to 2,000 Ohm

Operating temperature range

Ambient: -10 °C/+60 °C

Supply voltage

DC 24 V

Power consumption

2.5 W

Probe circuit

Max. AC 3 V

Relay output

Relay contact: 1 voltage-free
 changeover contact
 Contact rating: AC 250 V 750 VA
 DC 12 V 1 A

Visual indication

Green LED power „on“

Timer

Adjustable from 0 to 20 s

Fail-safe mode

Integrated selector for min. or max.
 fail-safe mode (low/high)

Housing

Standard DIN-rail housing made of impact resistant plastic (ABS)
 W x H x D: 73 x 55 x 112 mm

Protection

IP 40 (EN 60529)

Options

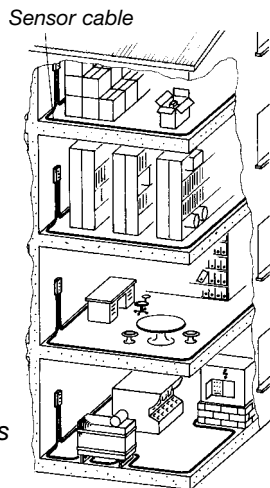
- Supply voltage AC 230 V

Probes

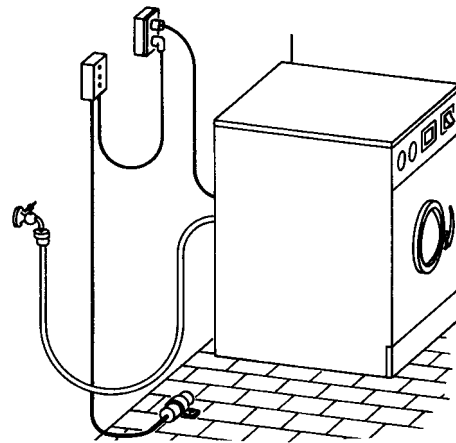
The probes are not included. Please order separately (refer to pages 43, 44)! Select according to the operating conditions. Special customer-specific probes are available in addition to the standard probes.

Version	DG	Part no.	Price €
ELT 680 DC 24 V	E	53682	
ELT 680 AC 230 V	E	53681	
Accessories:			
Alarm reset unit AQ 220	E	53230	
Combined visual and audible alarm unit	G	61020	
Cable extension fitting	G	40041	

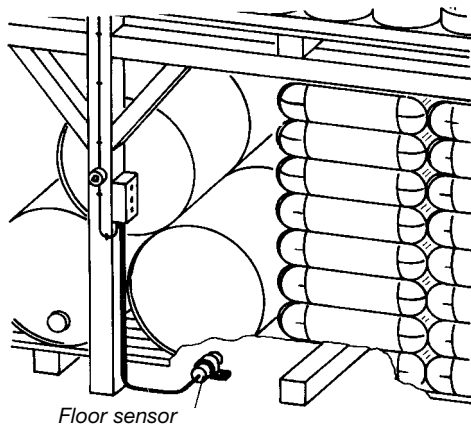
Application examples for conductivity level switches and leak monitoring probes



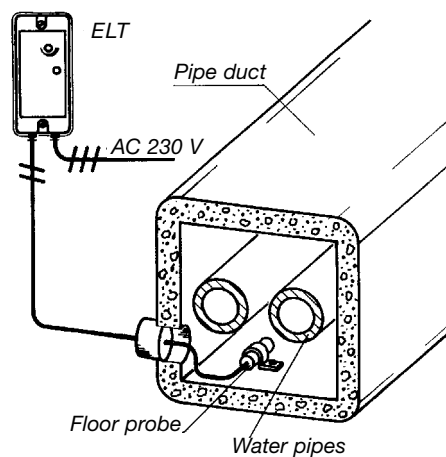
Office buildings
IT archives



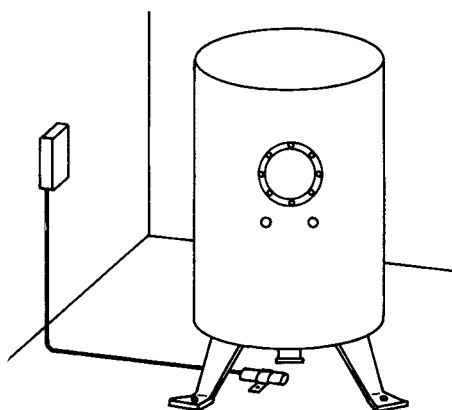
Laundry rooms, kitchens, basements



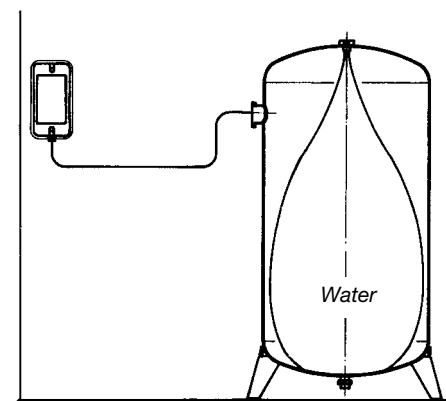
Warehouses, industrial facilities



Water pipes



Water treatment, boiler rooms

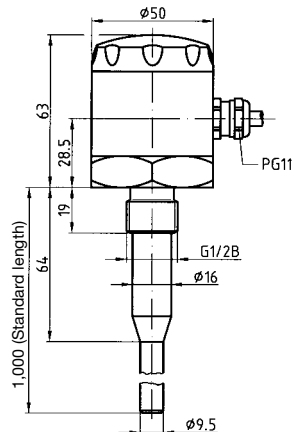


Indication of membrane rupture in large
expansion vessels

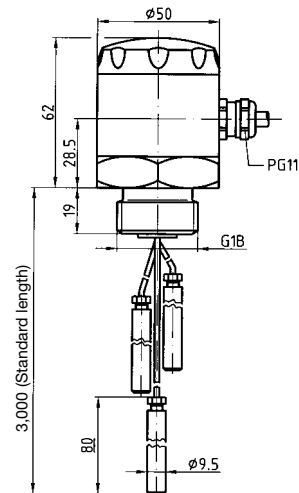
Probes for conductivity level switches

Types and dimensions (in mm)

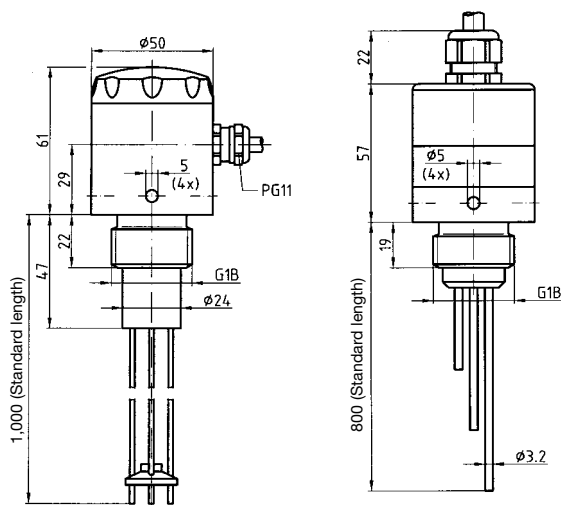
Single-rod probe LST 12



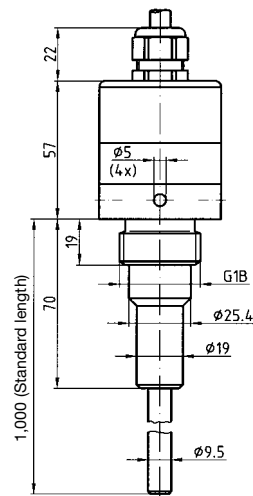
Flexible probe LSE 23



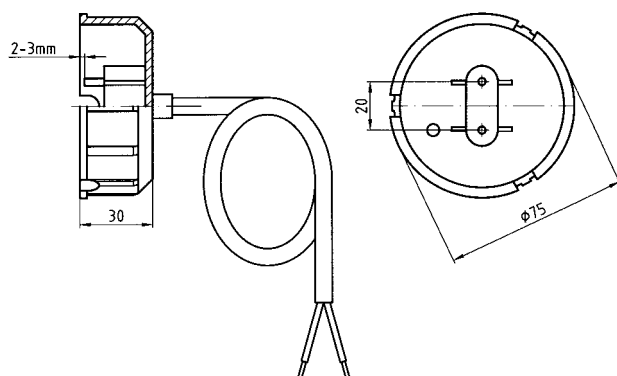
Multi-rod probes LSM 01/LSM 02



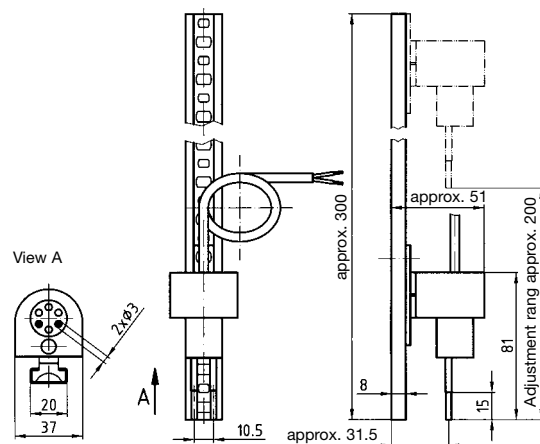
Single-rod probe LST 32



Floor water probe BWS 11



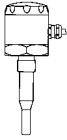
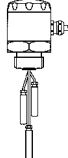
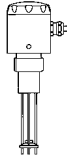
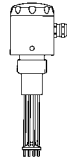
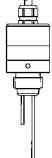
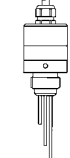
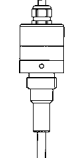
Wall mounted rail probe WSS



Many other special probe versions are available. Please enquire.

Probes for conductivity level switches

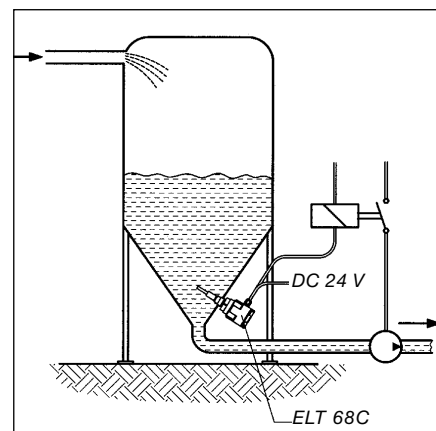
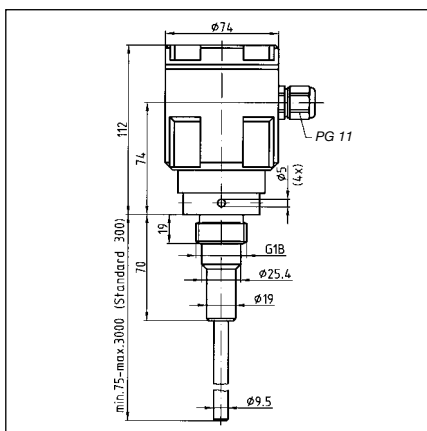
DG: E

Type	Single-rod probe LST 12	Flexible probe LSE 23	Triple-rod probe LSM 01	Quadruple-rod probe LSM 01	Dual-rod probe LSM 02	Triple-rod probe LSM 02	Single-rod probe LST 32
Version							
Type number	6921 21 1000	6622 27 1030	6272 14 1230	6272 14 1240	6812 24 002P	6812 24 003P	6812 21 000P
Suitable for	CoFox® ELT 8/CoFox® ELT 680						
Price € Part no.	55312	55323	55034	55021	55041	55044	55332
Probe head							
Material	Aluminium, screw cover ABS	Aluminium, screw cover ABS	PVC, screw cover ABS	PVC, screw cover ABS	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571
Electrical connection	PG 11	PG 11	PG 11	PG 11	2 m fixed cable	2 m fixed cable	2 m fixed cable
Protection	IP 66	IP 55	IP 65	IP 65	IP 66	IP 66	IP 66
Process connection	G1/2B	G1B	G1B	G1B	G1B	G1B	G1B
Electrodes							
Number	1	3	3	4	2	3	1
Material	1.4571	1.4571	1.4571	1.4571	1.4571	1.4571	1.4571
Insulator	PTFE	PTFE	Epoxy resin	Epoxy resin	PTFE	PTFE	PTFE
Diameter	9.5 mm	9.5 mm	3.2 mm	3.2 mm	3.2 mm	3.2 mm	9.5 mm
Length	1,000 mm	3,000 mm	1,000 mm	1,000 mm	800 mm	800 mm	1,000 mm
Application area							
Process pressure	0/3 bar	0/2 bar	0/3 bar	0/3 bar	0/10 bar	0/10 bar	-1/+20 bar
Temperature of medium	-20/+150 °C	2bar: 0/ 50 °C 1bar: 0/100 °C	0/50 °C	0/50 °C	-20/+120 °C	-20/+120 °C	-20/+220 °C
Wall mounted rail probe WSS							
Application			Height-adjustable, wall-mounted probe, suitable for CoFox® ELT 500/4 / CoFox® ELT 8 / CoFox® ELT 680				
Price € Part no.			55050				
Temperature of medium			0/50 °C				
Adjustment range			approx. 200 mm				
Electrical connection			fixed cable, 150 cm				
Floor water probe BWS 11							
Application			Suitable for CoFox® ELT 500/4 / CoFox® ELT 8 / CoFox® ELT 680				
Price € Part no.			55111				
Response level			approx. 2-3 mm				
Temperature of medium			0/50 °C				
Probe diameter			75 mm				
Material			PP, black				
Electrical connection			fixed cable, 150 cm				

Many other special probe versions are available. Please enquire.

Compact conductivity level switch

CoFox® ELT 68 C



Application

Suitable for use in electrically conducting materials, predominantly liquids, e.g. milk, wine or fruit juices.

Also suitable for foaming or adhesive media, e.g. beer or yoghurt. Specially designed for applications in the food industry.

Description

CoFox® ELT 68 C is a self-monitoring level switch operating on the basis of conductivity.

The unit is primarily used as a minimum level switch in breweries, dairies and ice-cream plants. The unit is also capable of detecting the interface between cleaning emulsions and the actual medium, e.g. milk/water, beer/foam, water/lye.

The sensitivity and adjustment range have been designed to ignore bridging resistances which could impair the reliability of the unit (e.g. foam across the electrode insulators in breweries, dairies and ice-cream plants).

The tank must be made of a conducting material and must not be coated inside.

If necessary, a separate ground electrode must be installed in the tank and connected to the welding gland.

The standard version includes the CoFox® ELT 68 C with a 300 mm probe made of stainless steel 1.4571 PTFE partly insulated. The fail-safe mode can be selected on the unit. The switching status is indicated by red and green LED's.

Technical specifications

Adjustment range

30 Ohm to 5 kOhm

Operating temperature range

Medium: -10 °C/+100 °C
(short-term 135 °C)

Process pressure

0/7 bar

Process connection

G1B

Electrode

Stainless steel 1.4571
PTFE partly insulated
300 mm long

Supply voltage

DC 24±4 V
Current input approx. 25 mA

Output

DC 0-24 V
(source resistance 56 Ohm)
Max. switching current 250 mA,
suitable for opto-isolators and reed
switches, 3-wire technology

Visual indication/relay switching state

Green LED normal operation
Relay energised
Output DC 24 V (High)
Red LED alarm condition
Relay de-energised
Output DC 0 V (Low)

Fail-safe mode

Integrated selector for min. or max. fail-safe mode

Housing

Aluminium die cast with screw cover, window for LED checking

Protection

IP 66 (EN 60529)

Electrical connection

Cable gland PG 11

Accessories

Welding gland 50 x 26 mm (ø x H)
(included with unit)

Options

- Other probe lengths (max. 3 m)

DG: E

Version	Part no.	Price €
ELT 68 C	53679	
Additional cost		
Probe extension per 100 mm		
Accessories		
Coupling relay KR 100 ST (1 x voltage-free changeover contact)	53700	

Compact capacitance level switch

CapFox® ENT 7

CapFox® ENT 7 with rod probe



CapFox® ENT 7
with flexible
probe



CapFox® ENT 7
HT version



Application

Suitable for detecting levels of powdered and finely grained bulk solids or of liquids. Especially suitable for use in silos, hoppers, tanks and containers.

Description

The CapFox® ENT 7 capacitance level switch forms with its associated probe a single compact unit.

The unit can be supplied with either a flexible or a rod probe. The probes, rigid or flexible (tensioned if required) can be mounted horizontally, vertically or at an angle. Flexible probes can also be retrofitted to the unit via an adapter.

The sensitivity is adjustable.

CapFox® ENT 7 features a voltage-free relay contact which switches when the pre-set level is reached. The relay contact is used to control ancillary electrical equipment such as conveyors, slider valves or flaps, pumps or blowers, visual or audible alarms, or as an input to a PLC.

Minimum or maximum fail-safe mode can be selected according to process requirements.

Technical specifications

Capacitance range

0-200 pF

Operating temperature range

Medium: -20 °C/+80 °C

Ambient: -20 °C/+60 °C

Process pressure

0/0.5 bar

Process connection

G1½B

Rigid rod probe

Stainless steel 1.4571 PP partly insulated, probe length 300 mm (min. length 300 mm – max. length 1,000 mm) or PTFE fully insulated, probe length 300 mm

Flexible probe

Stainless steel 1.4571, PP partly insulated probe length 3,000 mm (min. length 1,000 mm - max. length 6,000 mm)

Supply voltage

AC 230 V

Power consumption

5 VA

Relay output

Relay contact: 1 voltage-free changeover contact

Contact rating: AC 250 V 4 A (resistive load)

Fail-safe mode

Integrated selector for min. or max. fail-safe mode (low/high)

Housing

Impact resistant plastic (ABS)
W x H x D: 104 x 65 x 144 mm

Protection

IP 65 (EN 60529)

Electrical connections

2 x cable gland PG 11

Options

- Supply voltage DC 24 V
- Other probe lengths
- Other probe designs
- High-temperature version (HT) up to max. 220 °C

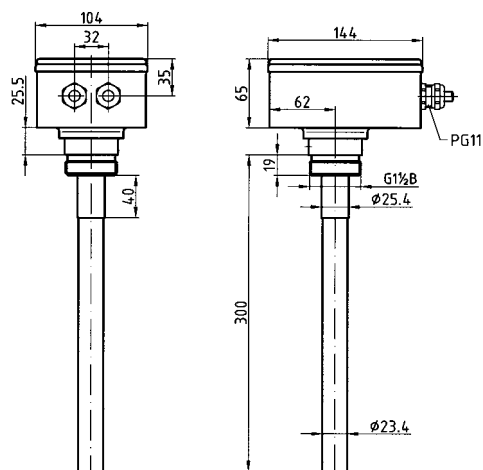
DG: E

Version	Part no.	Price €
ENT 7, 300 mm PP partly insulated	52701	
Additional cost, probe extension per 100 mm		
ENT 7, 300 mm PTFE fully insulated	52707	
ENT 7, 3 m flexible probe	52708	
Additional cost, probe extension per m		
ENT 7 HT high-temperature version up to max. 220 °C (300 mm active probe length)	52709	

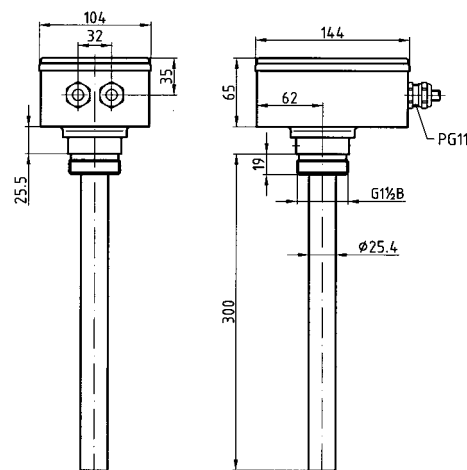
Capacitance level switch

CapFox® ENT 7 *Types, dimensions (mm) and application examples*

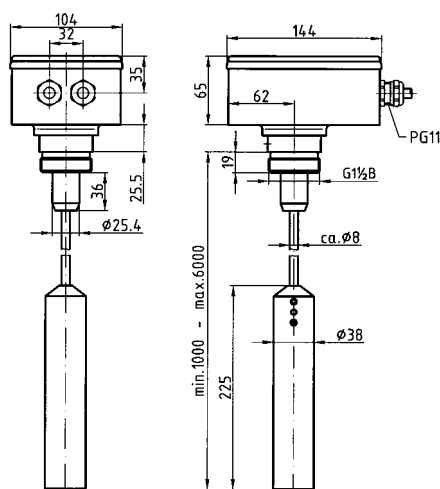
CapFox® ENT 7 with rod probe, PP partly insulated



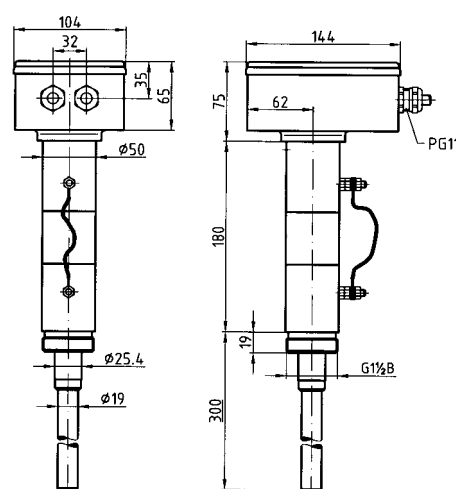
CapFox® ENT 7 with rod probe, PTFE fully insulated



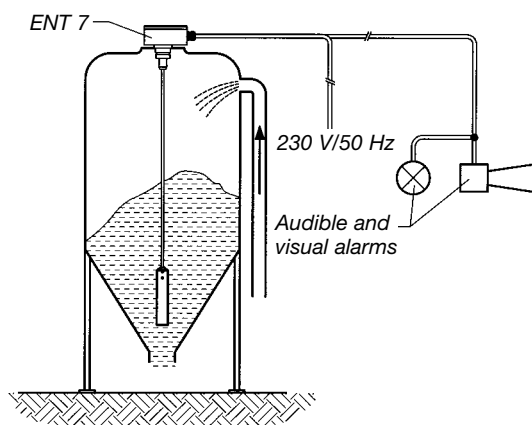
CapFox® ENT 7 with flexible probe



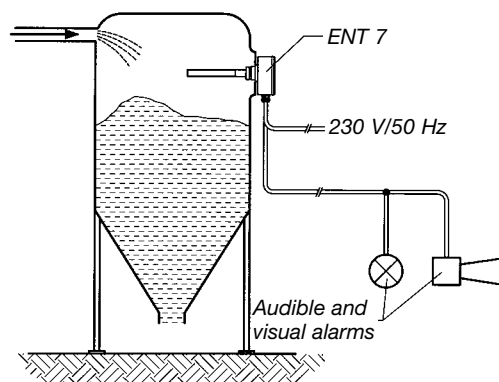
CapFox® ENT 7 HT with high-temperature barrier



Application example for flexible probe



Application example for rod probes



Many other special probe versions are available. Please enquire.

Capacitance overfill alarm systems according to WHG for corrosive media

CapFox® ENT 20 Ex



Probe CNS 20



Probe CNS 20 Ex



Application

The CNS 20 capacitance probes for electrically conducting and non-conducting media can be used in conjunction with the CapFox® ENT 20 Ex isolating amplifier as an overfill alarm system according to WHG.

The PTFE partly insulated probe renders the unit particularly suitable for use with corrosive liquids. The system can also be used in hazardous areas zone 0 in conjunction with the CNS 20 Ex high-temperature probe.

Description CapFox® ENT 20 Ex

The CapFox® ENT 20 Ex isolating amplifier consists of a switching amplifier and a voltage-free output relay. The control circuit is intrinsically safe (EEx ia II C). CNS 20 and CNS 20 Ex probes can be connected.

A green LED indicates mains „on“, a red LED indicates that the relay has responded. If a cable break or a short circuit occurs, the output relay de-energises, the red „fault“ LED lights up.

The isolating amplifier must be installed outside of the hazardous area.

Description CNS 20/CNS 20 Ex

The level electrode and the pre-amplifier of the CNS 20 and CNS 20 Ex probes are integrated in a sturdy weatherproof housing and designed as sensors according to NAMUR DIN EN 60947. The electrode and pre-amplifier are fully encapsulated in the housing.

The electrode is PTFE partly insulated. In conjunction with a conducting tank wall or an earthed counter-electrode, it forms a capacitor with a value depending on the dielectric characteristics of the immediate vicinity.

As soon as the gas around the electrode is replaced by a higher dielectric material, an increase in capacitance occurs and this is detected by the CapFox® ENT 20 Ex unit and used to switch the built-in relay.

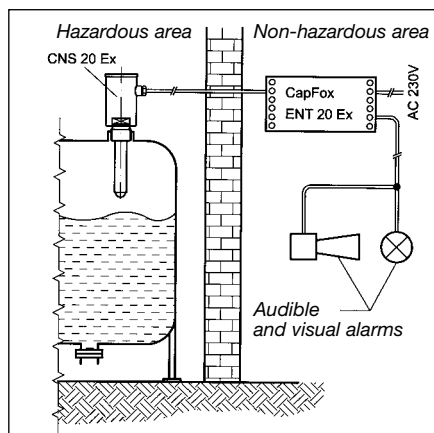
The constant direct current supplied by the pre-amplifier to the isolating amplifier is within a given range when there are no interferences. If a probe or connecting cable is defective, this range is exceeded, the relay switches and a visual alarm is generated.

Refer to page 49 for technical specifications, dimensions and an application example.

DG: H

Version	Part no.	Price €
CapFox ENT 20 Ex-230 AC 230 V	53420	
CapFox ENT 20 Ex-24 DC 24 V	53425	
Probes		
CNS 20-250 Length 250 mm	53430	
CNS 20-400 Length 400 mm	53432	
CNS 20-600 Length 600 mm	53434	
CNS 20-800 Length 800 mm	53436	
CNS 20-1000 Length 1000 mm	53438	
CNS 20 Ex-80 Length 80 mm	53440	
CNS 20 Ex-200 Length 200 mm	53442	
CNS 20 Ex-400 Length 400 mm	53444	
CNS 20 Ex-600 Length 600 mm	53446	
CNS 20 Ex-1000 Length 1,000 mm	53448	

Capacitance overfill alarm systems according to WHG for corrosive media



Technical specifications ENT 20 Ex

Operating temperature range
Ambient: -20 °C/+60 °C

Supply voltage
ENT 20 Ex-230 AC 230 V
ENT 20-Ex-24 DC 24 V

Power consumption
ENT 20 Ex-230 approx. 1.5 W
ENT 20-Ex-24 approx. 1.8 W

Probe circuit
According to
NAMUR DIN EN 60947

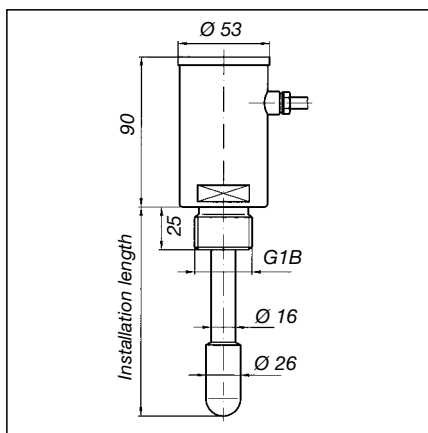
Relay output
Relay contact: 1 voltage-free
changeover contact
Contact rating: AC 250 V 8 A
DC 24 V 4 A

Visual indication
Green LED mains „on“
Yellow LED probe
Red LED alarm condition

Housing
Standard DIN-rail housing
W x H x D: 40 x 70 x 110 mm

Protection
IP 20 (EN 60529)

Approval
Overfill alarm system according to
WHG
TÜV 01 ATEX 1660 (Ex ia II C)



Technical specifications CNS 20

Operating temperature range
-20 °C/+80 °C

Process pressure
0/16 bar

Process connection
G1B according to DIN 3852 part 2

Installation lengths
250 to 1,000 mm as required

Electrode
PTFE fully insulated
Seal Viton

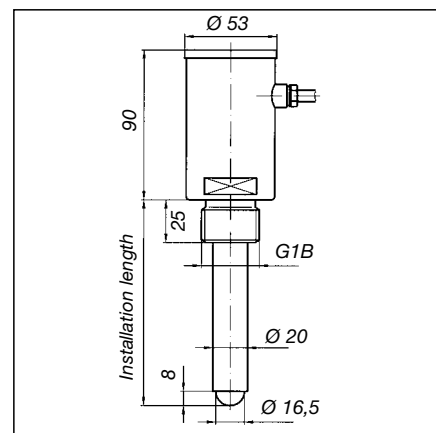
Switching characteristics
Contact with the medium (can be
adjusted in the terminal box via
potentiometer)

Housing
Robust weatherproof housing
with screw cover
Stainless steel 1.4571

Protection
IP 68 (EN 60529) on process side
IP 67 (EN 60529) on wiring side

Electrical connection
Cable gland PG 11

Approval
Overfill alarm system according to
WHG



Technical specifications CNS 20 Ex

Operating temperature range
-40 °C/+120 °C

Process pressure
0/30 bar

Process connection
G1B according to DIN 3852 part 2

Installation lengths
80 to 1,000 mm as required

Electrode
Stainless steel 1.4571
Probe tip PTFE insulated
Seal Viton

Switching characteristics
Contact with the medium (can be
adjusted in the terminal box via
potentiometer)

Housing
Robust weatherproof housing with
screw cover
Stainless steel 1.4571

Protection
IP 68 (EN 60529) on process side
IP 67 (EN 60529) on wiring side

Electrical connection
Cable gland PG 11

Approval
Overfill alarm system according to
WHG
TÜV 01 ATEX 1661 (Ex ia II C T6...T4)

Compact vibration level switch for liquids VibraFox® GVG



Application

Suitable for detecting levels in liquids with a maximum viscosity of 10.000 mm²/s and a minimum density of 0.7 kg/dm³.

Especially designed for applications in which float switches cannot be used due to liquid flow, turbulence or product adherence. Ideally suited as an overfill alarm or for dry-run protection of pumps. The WHG approved VibraFox® can be used as part of an approved overfill alarm system.

Description

The vibration fork of VibraFox® is excited to its resonance frequency. When the fork comes into contact with the medium a change in frequency occurs which is detected by the electronics and converted into a switching signal. The unique evaluation electronics enable the application of the system even under adverse conditions, e.g. in tanks with vibration or turbulent liquid surfaces.

VibraFox® vibration level switches feature:

- WHG approval
- Maintenance-free
- Compact design
- High resistance to chemicals
- Easy installation
- Various process connections
- Universal application

Technical specifications

Minimum density of medium
0.7 kg/dm³

Max. viscosity of medium
10,000 mm²/s

Operating temperature range
Medium: -40 °C/ +100 °C
Ambient: -40 °C/ +70 °C

Process pressure
-1 to 64 bar

Process connection
G³/₄B or G1B (PN 64)

Vibration fork
Stainless steel 1.4435
Installation length 69 mm or 117 mm

Supply voltage
AC/DC 20-253 V
Load current min. 10 mA max. 250 mA or DC 10-55 V
Load current max. 250 mA

Power consumption
AC version: depending on external load
DC version: max. 0.6 W

Output
2-wire AC/DC or transistor (PNP)

Switching delay

After immersion: 0.5 s
After removal: 0.5 s

Switch point

Vertical installation: 13 mm
Horizontal installation: 14 mm
(in water at 25 °C)

Switching hysteresis

Vertical installation: 2 mm
Horizontal installation: 2 mm
(in water at 25 °C)

Visual indication

Bi colour LED green/red

Operational test

With test magnet (included)

Housing

Stainless steel 1.4435, cover PEI

Electrical connection

Plug DIN 43650-A (IP 65)
or M 12 x 1 (IP 67)

Technical Approval of the German Institute for Building Technology:
Z-65.11-412

Options

- Extended operating temperature range -40 °C/+150 °C (medium)
- Other process connections
- Surface roughness Ra ≤ 0.8 µm
- Welding gland
- Other electrical connections
- Coupling relay (only for DC version)

Compact vibration level switch for liquids

VibraFox® GVG Dimensions (mm) and electrical connections



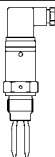
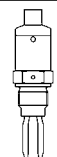
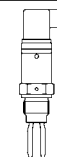
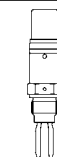
GVG 10/12 Standard version	GVG 10 HT/12 HT High temperature version	GVG 11 Standard version	GVG 11 HT High temperature version
GVG 13/14 Standard version	GVG 13 HT/14 HT High temperature version	GVG 10 MR/GVG 12 MR Dairy fitting	GVG 10 CP/GVG 12 CP Tri-Clamp
Wiring diagram 2-wire switching output		Wiring diagram transistor output PNP	

Compact vibration level switch for liquids

VibraFox® GVG



DG: E

Type	GVG 10	GVG 11	GVG 12	GVG 13	GVG 14
Version					
Process connection	G ³ /4A	G ³ /4A	G ³ /4A	G ³ /4A	G ³ /4A
Price € Part no.	56164	56166	56168	56170	56172
Process connection	G1A	G1A	G1A	G1A	G1A
Price € Part no.	56165	56167	56169	56171	56173
Installation length	69 mm	69 mm	69 mm	117 mm	117 mm
Supply voltage	AC/DC 20-253 V	DC 10-55 V	DC 10-55 V	AC/DC 20-253 V	DC 10-55 V
Output	2-wire switch- ing output	Transistor output PNP	Transistor output PNP	2-wire switch- ing output	Transistor output PNP
Electrical connection	Plug DIN 43650	M 12 x 1	Plug DIN 43650	Plug DIN 43650	Plug DIN 43650
Additional costs	Price €	Price €	Price €	Price €	Price €
Extended operating temperature range (medium) -40 °C/+150 °C					
Process connection*					
3/4" NPT					
1" NPT					
G ³ /4A/3/4" NPT, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
G1A/1"NPT, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
Tri-Clamp 1", PN 16, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
Tri-Clamp 1 1/2", PN 16, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
Tri-Clamp 2", PN 16, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
Dairy fitting DIN 11851, DN 25, PN 40, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
Dairy fitting DIN 11851, DN 40, PN 40, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
Dairy fitting DIN 11851, DN 50, PN 25, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
Dairy fitting SMS DN 38, PN 6, Ra ≤ 0.8 µm, -40 °C/+150 °C**					
*Additional costs as compared to version with process connection G ³ /4B					
**Additional costs already include extended operating temperature range -40 °C/+150 °					
Accessories				Part no.	Price €
Coupling relay KR 100 ST (only for DC versions) output: 1 x voltage-free changeover contact				53700	
Spare test magnet for operational test				56155	

Chapter 2

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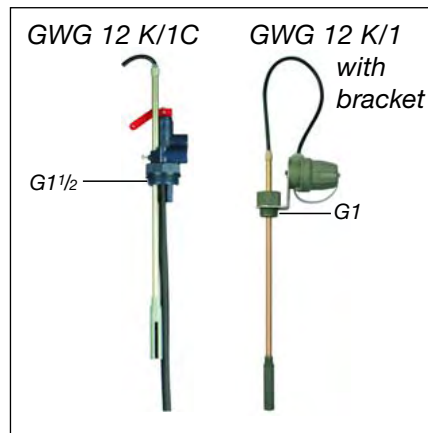
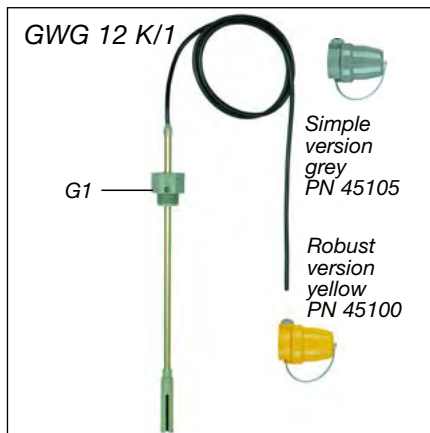
Overfill alarm systems and PTC thermistor type level controllers

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PTC thermistor type level sensors for indoor tanks

according to TRbF 511



GWG 12 K/1 yellow (PN 45100)

PTC thermistor type level sensor. Designed for use with battery type tanks made of sheet steel according to DIN 6620-1 design B and rectangular tanks according to DIN 6625-1 welded on site with heights between 1 and 4 m.

Storage liquid:

Fuel oil according to DIN 51603-1, diesel according to DIN EN 590, biodiesel according to DIN EN 14214. With G1 screw fitting. Adjustable from 70 to 338 mm. Height adjustment as per installation manual supplied.

The connection fitting for wall mounting type 905-yellow is impact resistant and shock resistant. A filler cap with type 906 GWG connection fitting can also be used. (refer to page 55)

Connection cable = 1.5 m long.

Use KVA for cable extension (refer to page 55). Technical Approval of the German Institute for Building Technology: Z-65.17-182

GWG 12 K/1 grey

Similar to PN AN 45100, but with grey fitting.

GWG 12 K/1/5 yellow (PN 45160)

Similar to PN 45100, but with 5 m long connection cable.

GWG 12 K/1/5 grey

Similar to PN 45100, but with grey fitting and 5 m long connection cable.

GWG 12 K/1 without fitting

Similar to PN 45100, but without connection fitting.

GWG 12 K/1/5 without fitting

Similar to PN 45160, but without connection fitting.

GWG 12 K/1C (Euroflex 312)

Similar to GWG 12 K/1 yellow, but with screw fitting which G1 1/2 which is designed as a withdrawal unit equipped with a rapid-action closing valve. With connections for flow, return and capillary tube.

GWG 12 K/1 with bracket

This unit is similar in application and design to GWG 12 K/1 (PN 45100) but with mounted type 905 connection fitting made of grey plastic.

The connection fitting is fixed to an aluminium bracket. The connection cable of the level sensor is pre-wired to the connection fitting. For tanks with direct tank top filling (without external fill point).

GWG 12 K/MT

Similar to GWG 12-K/1/5 yellow, but with a G1 1/2 screwed fitting and mechanical tank contents gauge MT-Profil R.

Measuring range = 250 cm

Connection cable = 5 m long.

Technical Approval of the German Institute for Building Technology for all series GWG 12 K level sensors: Z-65.17.182

DG: G	PU	Part no.	Price €
GWG 12 K/1 yellow	10	45100	
GWG 12 K/1 grey	10	45105	
GWG 12 K/1/5 yellow	10	45160	
GWG 12 K/1/5 grey	10	45165	
GWG 12 K/1 without fitting	10	45166	
GWG 12 K/1/5 without fitting	10	45167	
GWG 12 K/1C	5	20190	
GWG 12 K/1 with bracket	5	45104	
GWG 12 K/MT	5	45311	

Accessories for PTC thermistor type level sensors



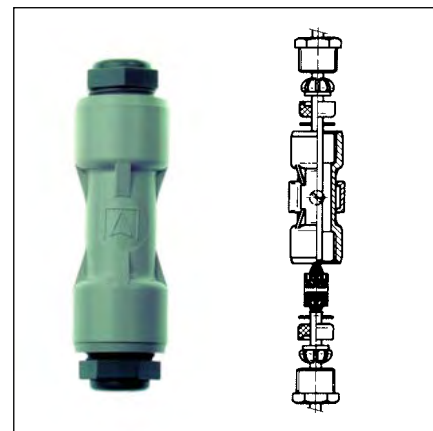
GWG filler cap

For fuel oil EL „standard“, diesel and bio-diesel. Bayonet connection G2 according to DIN EN 14420-6 with integrated level sensor connection fitting. Male coupling made of brass. Filler cap made of oil- and weather resistant plastic. Lockable.



GWG filler cap - green

For low sulphur fuel oil EL (green colour code). With red plate also approved for fuel oil EL „standard“, diesel and bio-diesel. Bayonet connection G2 according to DIN EN 14420-6 with integrated level sensor connection fitting. Male coupling made of brass. Filler cap made of oil- and weather resistant plastic. Lockable. Red plate (Also for fuel oil EL „standard“) is included. Please refer to page 103 for additional filler caps.



KVA

Cable extension fitting for 2-core electrical cables (max. 42 V/4 A). Clamp glands on both sides for cable diameters between 6 and 8.3 mm.

Reducer G1½ x G1

Reducer G1½ x G1 made of grey plastic (ABS).

Reducer G2 x G1½

Reducer G2 x G1½ made of grey plastic (ABS).

New directives:

1. The filler cap without colour code must only be used with systems which are exclusively used with fuel oil EL „standard“, diesel and bio-diesel.
2. The **green** filler cap must only be used with systems which are exclusively used with low sulphur fuel oil EL.
3. The **green** filler cap in conjunction with the **red plate** (Also for fuel oil EL „standard“) must only be used with systems using low sulphur fuel oil EL, EL „standard“, diesel and bio-diesel.



Please refer to page 452 for a complete range of GWG level sensor test instruments.



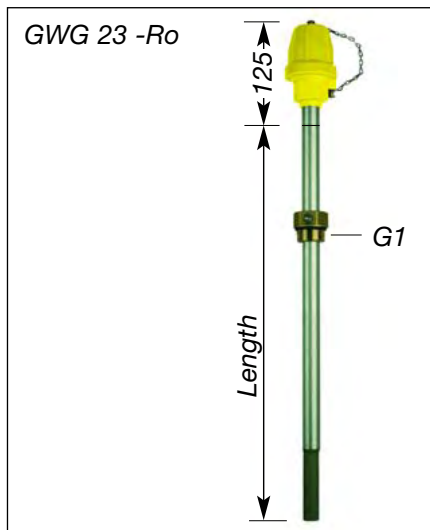
Please refer to page 57 for GWG fittings.

Check www.schwefelarmes-heizael.de to see whether the various units of a heating systems are suitable for use with low sulphur fuel oil EL.

DG: G	PU	Part no.	Price €
GWG-filler cap	10	20430	
GWG-filler cap - green	10	20443	
Reducer G1½ x G1	10	20905	
Reducer G2 x G1½	10	20903	
KVA	10	40041	

PTC thermistor type level sensors for outdoor tanks

according TRbF 511



GWG 23 - Ro

This PTC thermistor type level sensor is equipped with a height adjustable probe. It features a G1 brass screw fitting and is pressure- and vacuum tight (1 bar). Tube fitting made of yellow, high grade impact resistant plastic with strong chain and flange gasket. The version with grey fitting is impact resistant and equipped with a tie instead of the chain, without flange gasket. The number after the type designation indicates the length of the GWG level sensor. When selecting, please check to see that the fitting is as close as possible under the access chamber cover - the distance should not be less than 20 mm and not more than 300 mm.

Application area:

Aboveground and underground tanks containing fuel oil EL according to DIN 51603-1, diesel according to DIN EN 590 and bio-diesel according to DIN EN 14214.

- Cylindrical, horizontal tanks made of steel according to EN 12285-1, EN 12285-2 und EN 6624-1 or made of plastic or any other approved materials with shapes and dimensions which comply with the above mentioned standards and which are type approved.
- Cylindrical, vertical steel tanks according to DIN 6619-1, 6623-1.



Underground tanks according to TRbF 40 no. 5.2 containing petrol according to DIN EN 228:

- Cylindrical, horizontal steel tanks according to EN 12285-1 under the following conditions:
 1. The layer of earth covering the tank has to be at least 0.8 m thick.
 2. Not suitable for continuous fuel withdrawal.
 3. The withdrawal capacity per tank or tank compartment must not exceed 200 l/min.

4. The level sensor may only be connected to instruments which meet the requirements for the protection type „Intrinsically safe electrical systems“ according to VDE 0171 (DIN EN 50039).

(Fuel withdrawal is not considered continuous if the pumping process is interrupted several times within one hour, e.g. at petrol stations).

Aboveground tanks containing petrol according to DIN EN 228

- Cylindrical, vertical steel tanks according to DIN 6623-1 under special conditions.

GWG 23 - Wa

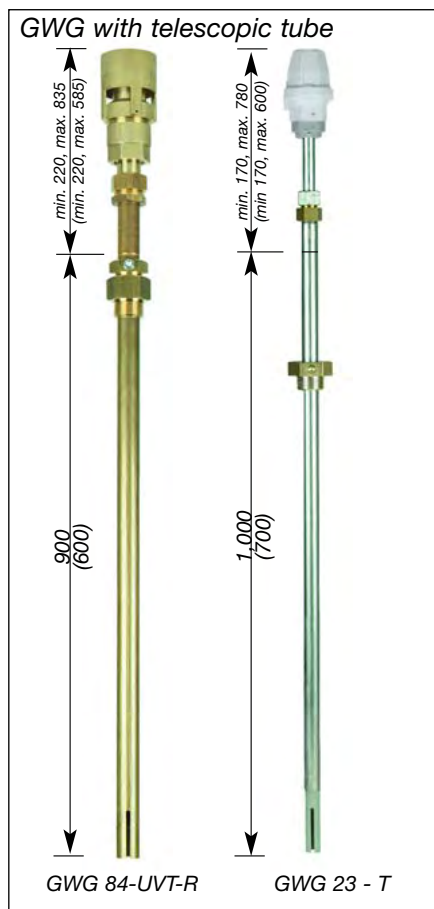
Similar to GWG 23 - Ro, but with a junction box at the upper tube end as well as fitting for wall mounting. Also suitable for use in vertical tanks according to DIN 6618-1 and flat bottom tanks according to DIN 4119-1.

Technical Approval of the German Institute for Building Technology for all series GWG 23 level sensors: Z-65.17-366.

DG: G	PU	Part no.	Price €
GWG 23 - Ro 400 yellow fitting	10	46115	
GWG 23 - Ro 700 yellow fitting	10	46116	
GWG 23 - Ro 1000 yellow fitting	10	46117	
GWG 23 - Ro 1500 yellow fitting	1	46120	
GWG 23 - Ro So yellow fitting special lengths of up to max. 3,000 mm	1	46118	
GWG 23 - Ro 400 grey fitting	10	46125	
GWG 23 - Ro 700 grey fitting	10	46126	
GWG 23 - Ro 1000 grey fitting	10	46127	
GWG 23 - Ro 1500 grey fitting	1	46129	
GWG 23 - Wa 400 yellow fitting	1	46130	
GWG 23 - Wa 700 yellow fitting	1	46131	
GWG 23 - Wa 1000 yellow fitting	1	46132	
GWG 23 - Wa 1500 yellow fitting	1	46135	
GWG 23 - Wa So yellow fitting special lengths of up to max. 3,000 mm	1	46133	

PTC thermistor type level sensors for outdoor tanks

according to TRbF 511



GWG 23 - T 700 grey fitting

Level sensor with telescopic tube for adjusting the height of the connection fitting. Application and version similar to the description for GWG 23 - Ro. Min length: 870 mm. Max. length: 1,300 mm.

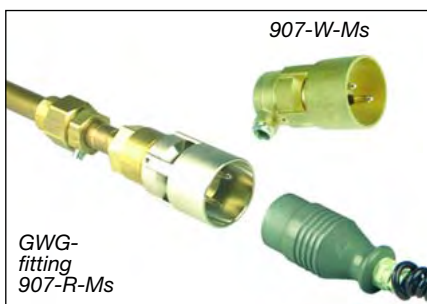
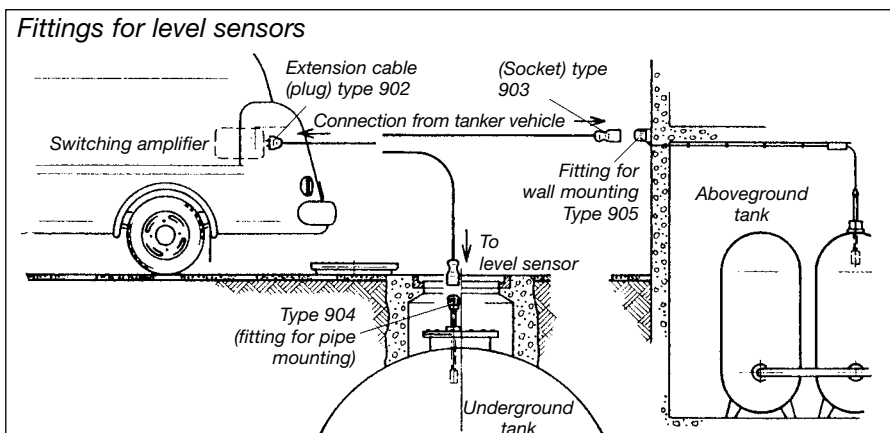
GWG 23 - T 1000 grey fitting

Level sensor with telescopic tube for adjusting the height of the connection fitting. Application and version similar to the description for GWG 23 - Ro. Min length: 1,170 mm. Max. length: 1,780 mm.

Technical Approval of the German Institute for Building Technology for level sensors GWG 23 - T 700 and GWG 23 - T 1000: Z-65.17-366.

GWG 84 - UVT-R-600-Ms

Heavy duty version of the GWG 23 - T 700 level sensor. PTC thermistor encapsulated in a stainless steel sleeve.



GWG fitting, tube and screw fitting made of brass. Min length: 820 mm. Max. length: 1,185 mm. Technical Approval of the German Institute for Building Technology: Z-65.17-363
 EC design type approval: TÜV 03 ATEX 2033 Ex II 1G EEx ia IIB T3

GWG 84 - UVT-R-900-Ms

Heavy duty version of the GWG

Various types of level sensor fittings are available depending on site conditions and requirements. Quality conscious customers often order the „yellow fitting“, oil companies often order the brass fittings.

23 - T 1000 level sensor. PTC thermistor encapsulated in a stainless steel sleeve. GWG fitting, tube and screw fitting made of brass. Min length: 1,120 mm. Max. length: 1,735 mm. Technical Approval of the German Institute for Building Technology Z-65.17-363

EC design type approval: TÜV 03 ATEX 2033 Ex II 1G EEx ia IIB T3

	DG:	PU	Part no.	Price €
GWG 23 - T 700 grey fitting	G	1	47622	
GWG 23 - T 1000 grey fitting	G	1	47623	
GWG 84 - UVT-R-600-Ms	H	1	47600	
GWG 84 - UVT-R-900-Ms	H	1	47610	
GWG fitting 907-R Ms	G	1	40060	
GWG fitting 905-W grey	G	1	40050	
GWG fitting 905-W yellow	G	1	40052	
GWG fitting 907-W Ms	G	1	40065	
Socket 903	G	1	40030	
Plug 902	G	1	40045	

PTC thermistor type level sensors (Ex)



GWG 81-D-Ex-R

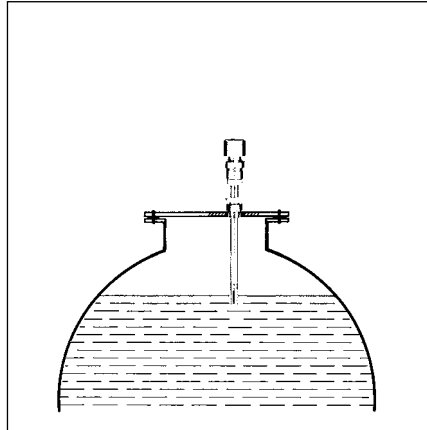
Ex approved level sensor with stainless steel encapsulated PTC thermistor (Zone 0) as part of an overfill prevention system. For tanks according to DIN 6608, 6616, 6617, 6624, 6619, 6623 or equivalent tanks with diameters and volumes according to DIN 6608. Storage media according to the listing on this page.

Equipped with a height adjustable probe made of stainless steel as well as a G1 brass screw fitting. With brass GWG fitting 907-R. The number after the type designation indicates the length of the level sensor.

Technical Approval of the German Institute for Building Technology: Z-65.17-362

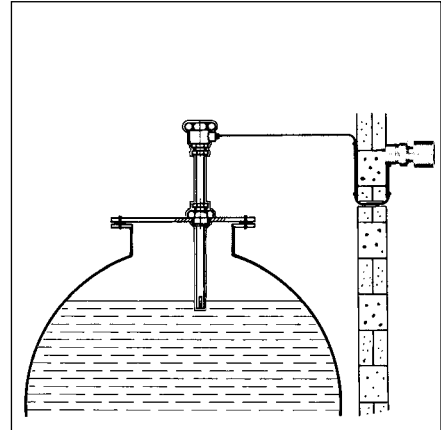
EC design type approval: TÜV 03 ATEX 2034

Ex II 1G EEx ia IIB T3 and
Ex II 1/2G EEx ia IIB T3



Application areas:

1. **Fuel oil EL** according to DIN 51603 part 1
2. **Fuels**
 - 2.1 Diesel according to DIN 51601
Bio-diesel according to DIN 51606
Petrol (super and regular) according to DIN 51600 and DIN 51607
Aviation fuel
Aviation/Gasoline 80
Aviation/Gasoline 100/100 LL
Aviation/Gasoline 115/145
 - 2.2 Aviation turbine fuels
Aviation turbine fuel kerosene type Jet-A
Aviation turbine fuel wide out type Jet-B
Aviation turbine fuel
3. **Special grade spirits**
Petroleum ether according to DIN 51630
Special boiling point spirit to DIN 51631



Solvent naphtha according to DIN 51632

Safety lamp petroleum spirit according to DIN 51634

FAM standard petroleum spirit according to DIN 51635

Lamp kerosene, solvent kerosene according to DIN 51636

4. **Aliphatic hydrocarbons**
Hexane, octane, nonane, n-decyl hydride, isodecyl hydride, heptane

Refer to list for further media.

Please enquire for coded plug inserts and filling hose control system (ASS).

GWG 81-D-Ex-W

Similar to GWG 81-D-Ex-R, but with a junction box at the upper tube end and GWG fitting 907-W for wall mounting.

	DG:	PU	Part no.	Price €
GWG 81-D-Ex 400-R	H	1	47455	
GWG 81-D-Ex 700-R	H	1	47456	
GWG 81-D-Ex 1000-R	H	1	47457	
GWG 81-D-Ex special length R Additional cost per 100 mm	net	1	47458	
GWG 81-D-Ex 400-W	H	1	47440	
GWG 81-D-Ex 700-W	H	1	47441	
GWG 81-D-Ex 1000-W	H	1	47442	
GWG 81-D-Ex special length W Additional cost per 100 mm	net	1	47447	

Overfill alarm system Ex (Zone 0) and WHG



LS 500

The control unit LS 500 can be used with level sensors LS 300 EU, LS 300 FU or LS 300 EPU (refer to page 60). Approved without a list of materials for inflammable liquids (Zone 0) and non-inflammable, water polluting liquids (WHG/VAWS).

Technical Approval of the German Institute for Building Technology: Z-65.11-228

EC design type approval: TÜV 00 ATEX 1641 Ex II (1)G [EEx ia] IIC

The control unit supplies the level sensor via an intrinsically safe circuit, evaluates the change in resistance of the PTC thermistor, continuously checks the PTC thermistor operation and monitors the system (power failure, short-circuit, cable breaks, etc.). The output signal of the control unit is a voltage-free relay contact. Negative test results cause the overfill alarm system to respond. A scanner integrated in the transducer monitors the PTC thermistor.

The warming up and cooling down characteristics of the PTC thermistor are checked several times per second. The unit features extremely high operational safety and a long

service life as a result of the monitoring and self-diagnostics functions described.

The overfill alarm system has to be set up to either stop the filling process or to trigger visual and audible alarms (with sufficient volume: 70 dbA at a distance of 1 m) when the maximum level is reached. The control unit is installed outside of the hazardous area.

Technical specifications

Supply circuit

Supply voltage: AC 230 V

Power consumption: max. 4 VA
(Supply voltage: DC 24 V or AC 24 V at additional cost)

Output current circuit

1 voltage-free changeover contact

Sensor current circuit (intrinsically safe)

Voltage: ≤ DC 15.8 V

Current: ≤ 154 mA

Power: ≤ 600 mW

Operating temperature range

-25 °C/+50 °C

Housing

Plug-in housing, protection IP 40
W x H x D: 75 x 150 x 110 mm

LS 500.AK5-19, Fail Safe AC 24 V LS 500.AK5-19, Fail Safe DC 24 V

The LS 500.AK5-19 fail-safe 19" rack mounting control unit can be used with all type LS 300... level sensors (including already installed ones). This combination meets the requirements of class AK5. Periodic tests of the overfill alarm system are no longer required with LS 500.AK5. Specifications are similar to LS 500, but designed as a 19" rack mounting unit.



Alarm re-set unit AQ 220

This alarm re-set unit is designed for connection to overfill alarm and leak alarm systems. Integrated visual and audible alarms indicate alarm or system fault conditions. The audible alarm can be muted with the built-in re-set button. The visual alarm remains on until either a „high level“ condition is cleared and the probe is no longer in contact with the medium or a system fault condition has been corrected. As soon as the visual alarm extinguishes, the system resumes normal operational mode. Additional external alarm units can also be connected and re-set.

Technical specifications

Supply voltage

AC 230 V

Outputs

1 voltage-free, normally open contact (horn)

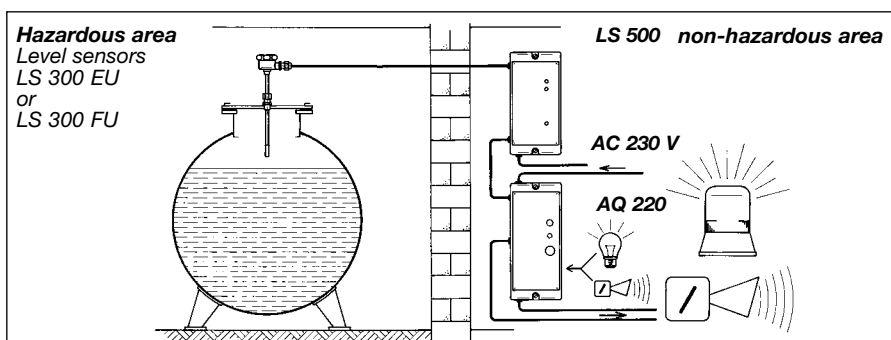
1 voltage-free, normally open contact (lamp)

Operating temperature range

-5 °C/+50 °C

Housing

Plug-in housing, protection IP 30
W x H x D: 50 x 110 x 110 mm



PU: 1	DG	Part no.	Price €
LS 500	H	53310	
LS 500.AK5-19 Fail Safe AC 24V	H	53312	
LS 500.AK5-19 Fail Safe DC 24V	H	53313	
Alarm re-set unit AQ 220	E	53230	

Overfill alarm system Ex (Zone 0) and WHG



Level sensor LS 300 EU

Together with the LS 500 control unit (refer to page 59), the LS 300 EU sensor is an approved part of an overfill alarm system according to **WHG** (self-monitoring and with automatic corrosion monitoring). Approved without a list of materials for inflammable liquids (Zone 0) and non-inflammable, water polluting liquids (WHG).

LS 300 EU consists of a height adjustable probe tube made of stainless steel with a PTC thermistor sensor element at the bottom end, a G $\frac{3}{8}$ screw fitting made of stainless steel and a chrome-plated brass junction box with integrated overvoltage protection. Standard length 500 mm, max. length 3,000 mm. Suitable for installation in all types of tanks and pipes.

Hazardous area classification EEx ia IIC T4. The sensor can be used in inflammable liquids up to 3 bar pressure (please specify higher pressure ranges when ordering). The sensor is suitable for liquid temperatures from -25 °C/+50 °C or from -25 °C/+80 °C.

Technical Approval of the German Institute for Building Technology: Z-65.11-228



EC design type approval:

TÜV 00 ATEX 1656X

Ex II 1G EEx ia IIC T4

Ex II 1/2G EEx ia IIC T4

Level sensor LS 300 FU

The LS 300 FU level sensor consists of a probe tube welded to the flange (gas-tight) and can be installed in tanks with pressures up to 3 bar. (Please specify higher pressures when ordering). A stainless steel version with coating is available for use in containers with very corrosive media (acids). An additional protective sensor sleeve can be supplied if strong gas/air flows are present around the response part of the level sensor. Approval specifications are as for type LS 300 EU.

Please indicate the following when ordering:

Response length in mm

Pressure level (max. 25 bar) PN

Nominal width DN

Flange norm according to

EN 1092 /ASME

Medium (stored liquid)

Please enquire for special versions with 2 response points or different materials.

Level sensor LS 300 ESPU

The LS 300 ESPU level sensor with integrated testing unit is self-monitoring and features automatic corrosion monitoring. Together with the LS 500 transducer (refer to page 59), it is approved as part of an overfill alarm system according to **WHG** for inflammable and non-inflammable liquids, without a list of materials.

Approval specifications are as for type LS 300 EU.

The function test is carried out on the installed unit either by means of a portable test instrument or a stationary nitrogen system. The PTC thermistor is subjected to a gas flow (air, nitrogen) which cools it down. In this way, it is subjected to a genuine function test.

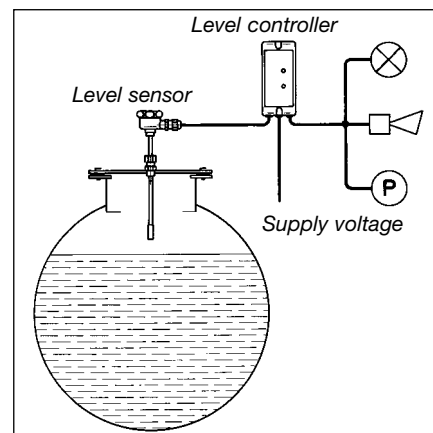
All wetted parts are made of stainless steel 1.4571. The probe head housing is also made of stainless steel (please enquire for other materials). G1 screw connection, standard probe length 1,000 mm, see additional costs for other lengths.

Level sensor LS 300 FSPU

Similar to LS 300 ESPU, but with flange. Order information similar to LS 300 FU.

DG: H	Part no.	Price €
Level sensor LS 300 EU	53300	
Additional cost for high temperature version -25 °C/+80 °C		on request
Special lengths – additional cost per 100 mm		on request
Level sensor LS 300 FU	53307	
Level sensor LS 300 ESPU	53305	
Special lengths – additional cost per 100 mm		on request
Level sensor LS 300 FSPU	53306	

Overfill alarm systems (WHG)



Level controller NB 220 QSA

This level controller in a wall mounted housing features state-of-the-art safety circuits. An internal control circuit (scanner) provides continuous monitoring of the sensor's function, short circuit or defective cable. Alarm indication, audible signal, test button, re-set button for the alarm buzzer, a voltage-free relay contact for the external alarm lamp as well as an additional resettable relay contact for the external alarm horn are integrated in the unit. Approved with type 76 A, 76 C, 76 M, 76 N, 76 S, 76 W level sensors for the following inflammable and non-inflammable, water polluting liquids.

Technical Approval of the German Institute for Building Technology: Z-65.11-193

Application area

Inflammable liquids:

- Diesel fuel according to DIN 51601
- Bio-diesel according to DIN 51606
- Fuel oil EL according to DIN 51603, part 1
- Used gear and engine oils
- Hexanol 1
- Ethyl aceto-acetate (aceto-acetic ester)
- Acrylic acid 2 ethylic hexylic ester
- Cyclohexanol acetate
- Benzaldehyde
- Methyl aceto-acetate
- Nitrobenzene
- 1.2 dichlorobenzene
- 2.4 dimethylaniline (N, N dimethylaniline)

- n octanol (n octyl alcohol)
 - Diethyloxalate
 - Aniline
- plus comparable inflammable liquids with similar heat conductivity.

Non-inflammable, water polluting liquids:

- Unused engine, gear and hydraulic oils
 - Transformer oil
 - Vegetable oil
 - Antifreeze agents
 - Oil/water mixtures (e.g. drilling oil or lubricating oil)
 - Cleaning agent/water mixtures
 - Perethylene and trichloroethylene
- plus comparable non-inflammable, water polluting liquids with similar heat conductivity.

Technical specifications

Supply voltage

AC 230 V (optional AC 24 V, 110 V or DC 24 V)

Power consumption

3 VA, 5 W

Outputs

1 voltage-free changeover contact for alarm lamp, solenoid valve, or pump

1 voltage-free, re-settable change-over contact for audible alarms

Contact rating for external alarm lamps and audible alarms:

AC 230 V; 2,5 A; max. 500 VA

DC 250 V; 0,25 A; max. 50 W

Housing

W x H x D: 97 x 163 x 62 mm

Protection

IP 30 (EN 60529)

Sensor current circuit

Voltage: ≤ 12.6 V

Current: ≤ 90 mA

Power: ≤ 700 mW

Re-set current circuit

Voltage: ≤ 12.6 V

Current: ≤ 20 mA

Power: ≤ 60 mW

NB 220 QSA-AC 24 V

This level controller is similar to NB 220 QSA but with supply voltage AC 24 V.

NB 220 QSA-DC 24 V

This level controller is similar to NB 220 QSA but with supply voltage DC 24 V.

Slave unit Type 907 Z

Can be connected to NB 220 QS (refer to page 62) as an additional control unit to enable connection to a road tanker fitted with an over-fill prevention system.

DG: H, PU 1	Part no.	Price €
Level controller NB 220 QSA	53231	
NB 220 QSA - AC 24 V	53231A	
NB 220 QSA - DC 24 V	53231B	
Slave unit Type 907 Z	53232	

Overfill alarm systems (WHG)



Level controller NB 220 H

When used with series 76 A and 76 W sensors, the controller is type approved as part of an overfill alarm system for stationary tanks containing inflammable liquids of danger class A III, e.g. gear and engine oils as well as non-inflammable water polluting liquids. Refer to page 61 for list of liquids (list of materials). When the level sensor comes in contact with the liquid, the integrated relay is de-energised, the voltage-free changeover contact switches to alarm position. Technical Approval of the German Institute for Building Technology: Z-65.11-185

Technical specifications

Supply voltage: AC 230 V

Power consumption: max. 4 VA

Output: Voltage-free changeover contact

Contact rating:

AC 230 V, max. 500 VA

Housing: Plug-in housing, IP 30

W x H x D: 50 x 110 x 110 mm



Level controller NB 220 QS

The NB 220 QS level controller is similar to NB 220 H but with integrated alarm lamp, alarm horn and button for muting the alarm horn. With connection terminals at which AC 230 V are available for an external lamp and horn in case of alarm. One terminal (no. 4) has AC 220 V during monitoring for the connection of e.g. a solenoid valve, pump or auxiliary contactor. Approved with level sensors 76 A and 76 W. Technical Approval of the German Institute for Building Technology: Z-65.11-185

Technical specifications

Supply voltage: AC 230 V

Power consumption: max. 4 VA

Output current circuits:

- External lamp AC 230 V max. 100 W
- External horn AC 230 V max. 50 VA
- Pump, solenoid valve AC 230 V max. 50 VA

Housing: Plug-in housing, IP 30

W x H x D: 75 x 150 x 110 mm



Level sensor type 76 A

Approved as part of an overfill alarm system together with level controllers NB 220 H, NB 220 QS and NB 220 QSA. Stainless steel probe tube with the PTC thermistor encapsulated in stainless steel at the bottom end. Junction box and screw fitting are made of brass. Connection thread G³/₄. Tube length 100 to 3,000 mm in increments of 100 mm. Standard length 500 mm. The unit is suitable for use in the liquids contained in the list of materials on page 61. The overfill alarm system has to be set up to either stop the filling process or to trigger an audible alarm with sufficient volume when the maximum level is reached. The level sensor is safe at liquid temperatures from -25 °C/+50 °C. (Please enquire for higher temperature ranges). Technical Approval of the German Institute for Building Technology: Z-65.11-185. An additional protective sensor sleeve can be supplied if strong gas/air flows are present around the response part of the level sensor.

Level sensor type 76 W

This level sensor is similar to type 76 A but with 3,000 mm long cable, brass probe pipe with 24 mm diam., G1 screw fitting. Refer to page 61 for list of materials.

Level sensor type 76 N

Probe tube and screw fitting made of stainless steel, brass parts at the probe head are specially hard chrome plated, for AdBlue (32.5 % urea acid). Response length 500 mm. Only together with level controller NB 220 QSA (refer to page 61).

DG: H	PU	Part no.	Price €
Level controller NB 220 H	1	53210	
Level controller NB 220 H - DC 24 V	1	53219	
Level controller NB 220 QS	1	53213	
Level sensor type 76 A	1	53209	
Type 76 A response lengths: 100 mm 200 mm 300 mm 400 mm		53225 53217 53220 53207	
Typ 76 A special lengths: Additional cost per 100 mm			
Level sensor type 76 W	1	53250	
Typ 76 W special length: Additional cost per 100 mm			
Level sensor type 76 N	1	53256	
Typ 76 N special length: Additional cost per 100 mm		53257	
Intermediate length			

PTC thermistor type level controller



RG 210

PTC thermistor type level controller with selectable functions:

- Level switch (1 probe)
- Level control for filling (2 probes)
- Level control for emptying (2 probes)

For use with electrically conducting and non-conducting liquids which are not viscous or adhesive: fuel oil, diesel, emulsions, water, and media which are not corrosive.

- **Level switch** with 1 probe:
The relay switches when contact or loss of contact with the liquid occurs. When the switch point is set, it must be observed that the PTC thermistor requires 5 to 60 seconds to warm up depending on the ambient temperature.
- **Level control for filling** with 2 probes: Set internal switch to „fill“. Relay energises when min. probe is operational. Relay de-energises when max. probe comes into contact with the liquid.

- **Level control for emptying** with 2 probes: Set internal switch to „empty“. Relay energises when max. probe has contact with the liquid. Relay de-energises when the min. probe loses contact with the liquid and the thermistor warms up again.

Attention: Not to be used as an overfill alarm system according to TRbF. Requires either the connection of an overflow pipe to the tank or the additional installation of an overfill alarm system according to TRbF/WHG.

Technical specifications

Operating temperature range

Medium: -25 °C/+55 °C
Ambient: -10 °C/+55 °C

Probe

PTC thermistor probe, types 150 or 937

Cable length 3 m (max. 50 m)

Process connection G1

Supply voltage AC 230 V

Power consumption 12 VA

Relay contact (output)

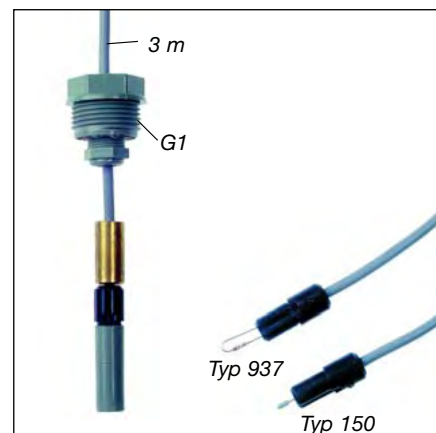
1 voltage-free changeover contact

Housing

Plug-in housing, IP 30 (EN 60529)

W x H x D: 50 x 110 x 110 mm

DG: H, PU 1	Part no.	Price €
RG 210	53206	
Flex. PTC thermistor probe type 150	53208	
Flex. PTC thermistor probe type 937	53204	



Flexible PTC thermistor probe type 150

Flexible PTC thermistor probe designed for use with electrically conducting and non-conducting liquids which are not viscous or adhesive, for connection to RG 210. Refer to RG 210 for further characteristics of the liquids.

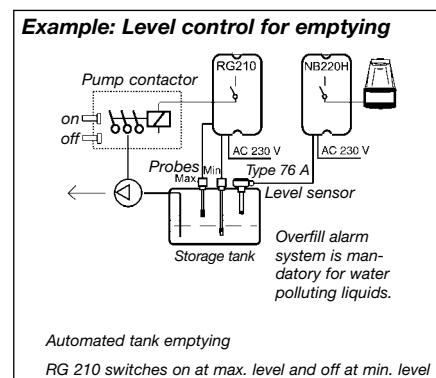
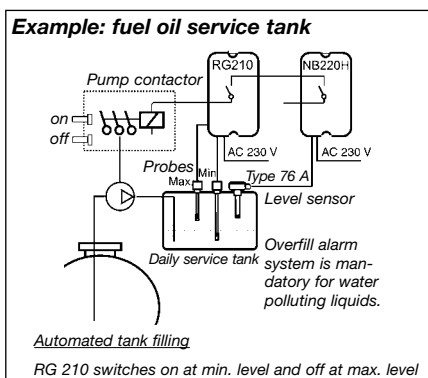
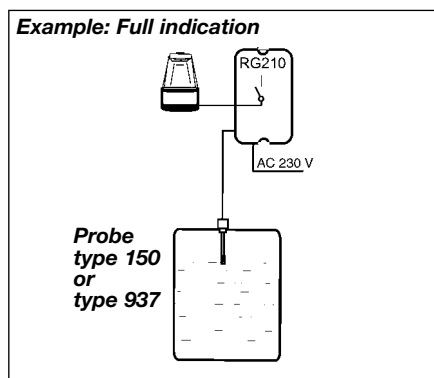
The PTC thermistor is encapsulated in a glass sleeve embedded in silicone with oil resistant probe cable (3 m long) and G1 gland, pressure proof up to 1 bar.

Flexible PTC thermistor probe type 937

Flexible PTC thermistor designed for oils and other electrically non-conducting liquids (low viscosity, non-adhesive).

The PTC thermistor connection wires are not insulated. Not suitable for installation in damp environments.

Application examples: also refer to page 506, AQ 220 alarm re-set unit.



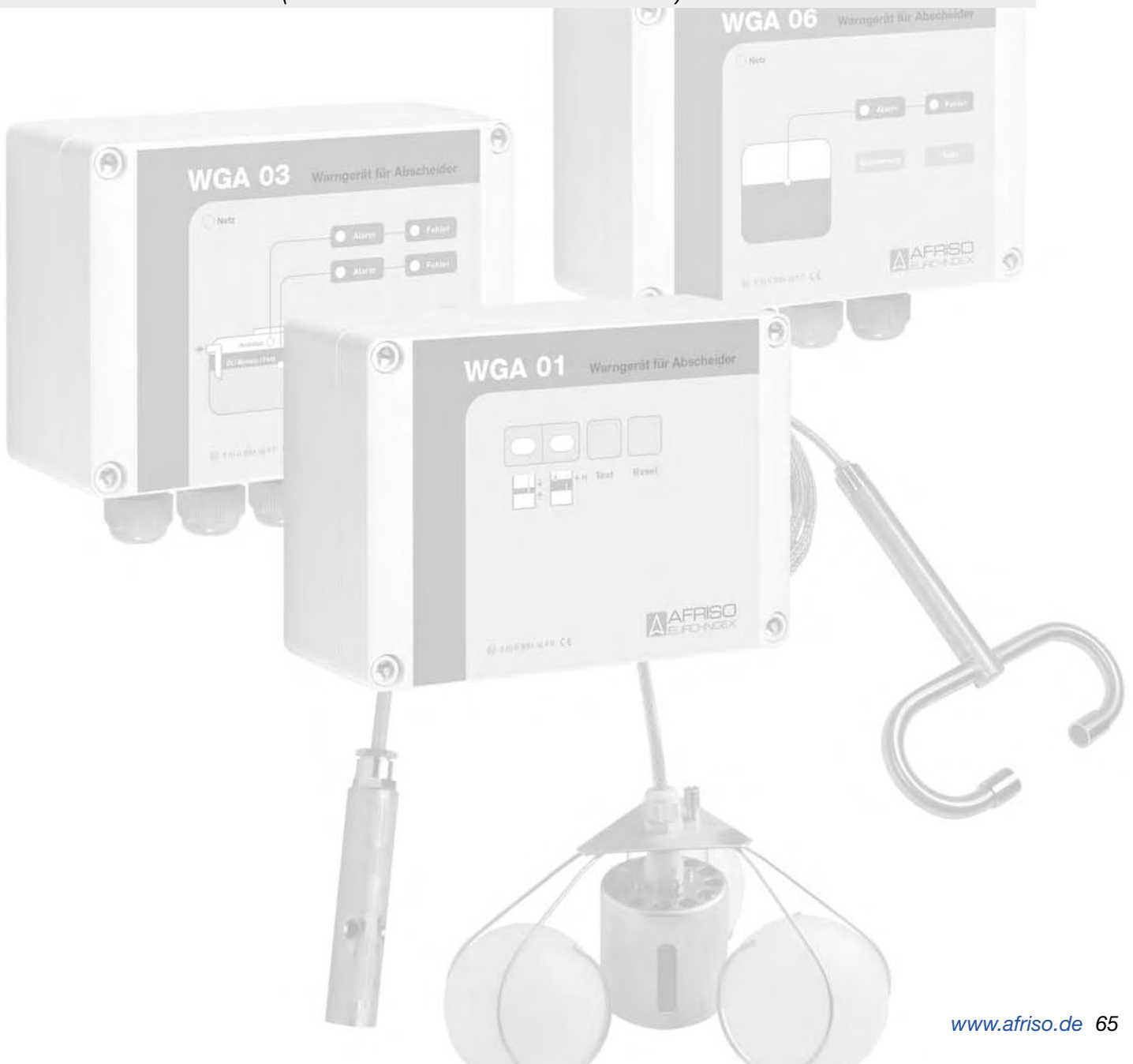
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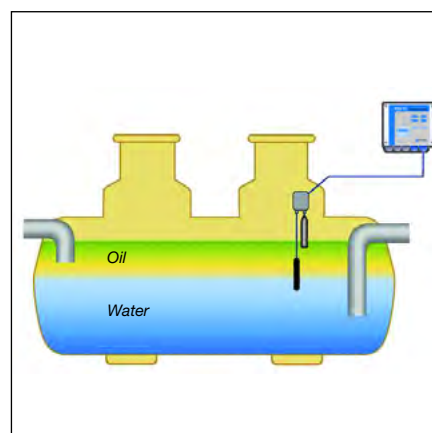
Alarm units for oil, petrol and grease separators

03

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Alarm unit WGA 01 for oil and petrol separators *(layer level alarm/overflow alarm)*



Application

Oil and petrol pose a great danger to groundwater and waste water. WGA 01 monitors the level of the separated liquid in oil/petrol separators and generates an alarm signal when it is necessary to empty the separator. In addition, the maximum level in the separator can be detected. This prevents overfilling caused by clogged outlets or other circumstances. The unit prevents harmful substances from being discharged into the mains drainage system.

Description

WGA 01 consists of an evaluation unit, a capacitance probe (WGA-ES4) for detecting the layer level as well as an optional additional PTC thermistor probe (WGA-R6) for detecting the maximum level (overflow alarm). The evaluation unit is equipped with 2 relay outputs, visual and audible alarms as well as test and re-set buttons. The WGA-ES4 probe is mounted at least 150 mm below the constant level of the separator. As soon as the oil or petrol layer reaches the critical level, the unit generates an alarm signal. By installing an additional optional WGA-R6 probe above the constant level, the maximum permissible level in the separator can also be detected. The evaluation unit monitors the connected probes and signals short circuits or cable breaks in the probe circuits.

Technical specifications

Operating temperature range

Medium: 0 °C/+40 °C
Ambient: 0 °C/+40 °C

Probe WGA-ES4

Principle of operation: capacitance
Length 220 mm, Ø 25 mm

Probe WGA-R6 (option)

Principle of operation:
PTC thermistor
Length 100 mm, Ø 22 mm

Probe cable

Cable length 5 m

Distance probe - evaluation unit

Max. 200 m

Supply voltage

AC 230 V

Power consumption

approx. 4 VA

Relay outputs

Relay contacts, voltage-free changeover contacts (cannot be reset)
1 x for layer level
1 x for overfilling (overflow alarm)
Contact rating:
AC 250 V/5 A/ 100 VA

Visual indication

1 green LED layer level (normal)
1 green LED overflow (normal)
1 red LED layer level (alarm)
1 red LED overflow (alarm)

Audible alarm

Integrated piezo-buzzer, re-settable

Operational test

Integrated test button

Housing

Wall mounting housing made from impact resistant plastic (polycarbonate)
W x H x D: 175 x 125 x 75 mm

Protection

IP 65 (EN 60529)

Electrical connections

4 x cable glands
ATEX approvals

Evaluation unit:

Ex II (1) G [EEx ia] II B

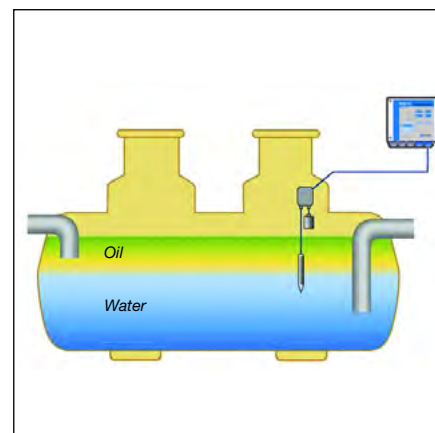
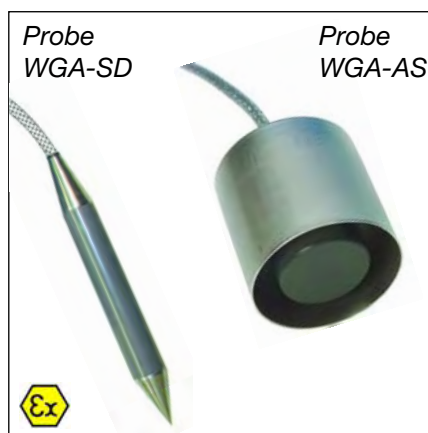
Probes:

WGA-ES4: Ex II 1 G EEx ia II A T4

WGA-R6: Ex II 1 G EEx ia II A T3

DG: E	Part no.	Price €
WGA 01 with probe WGA-ES4 (layer level)	53410	
Additional probe WGA-R6 (overflow)	53419	
Spare probe WGA-ES4	53418	

Alarm units WGA 02/WGA 03 for oil, petrol and grease separators (layer level alarm/overflow alarm)



Application

Oil, grease and petrol pose a great danger to groundwater and waste water. WGA 02 monitors the thickness of the layer of separated liquid in oil, petrol and grease separators and generates an alarm signal when it is necessary to empty the separator. WGA 03 can also detect the maximum level in the separator. This prevents overflowing caused by clogged outlets or other circumstances. The unit prevents harmful substances from being discharged into the mains drainage system.

Description

WGA 02 consists of an evaluation unit and a conductivity probe (WGA-SD) for detecting the separating layer level. The evaluation unit is equipped with 2 relay outputs, visual and audible alarms as well as test and re-set buttons. The WGA-SD probe is mounted below the constant level of the separator. As soon as the oil, petrol or grease layer reaches the critical level, the unit generates an alarm signal. WGA 03 is equipped with an additional capacitance probe (WGA-AS). This is mounted above the constant level. An alarm is triggered when the maximum permissible level is reached. The evaluation unit monitors the connected probes and signals short circuits or cable breaks in the probe circuits.

Technical specifications WGA 02

Operating temperature range

Medium: 0 °C/+60 °C
 Ambient: -25 °C/+50 °C

Probe WGA-SD (layer level)

Principle of function: conductivity
 Length 214 mm, Ø 25 mm

Probe cable

PVC, oil resistant, length 5 m

Distance probe - evaluation unit

Max. 300 m

Supply voltage

AC 230 V

Power consumption

approx. 2 VA

Relay outputs

Relay outputs, 2 voltage-free changeover contacts (1 can be reset)
 Contact rating: AC 250 V/
 5 A/100 VA

Visual indication

1 green LED normal operation
 1 red LED alarm
 1 red LED fault

Audible alarm

Integrated piezo-buzzer, re-settable

Operational test

Integrated test button

Housing

Wall mounting housing made from impact resistant plastic (polycarbonate)
 W x H x D: 175 x 125 x 75 mm

Protection

IP 65 (EN 60529)

Electrical connections

4 x cable gland M16

ATEX approvals

Evaluation unit:
 Ex II (1) G [Ex ia] II C
 Probe WGA-SD:
 Ex II 1 G EEx ia II A T4

Additional specifications WGA 03

Probe WGA-AS (overflow)

Principle of function: capacitance
 Length 81 mm, Ø 82 mm

Power consumption

approx. 4 VA

Visual indication

1 green LED normal operation
 2 red LEDs alarm
 2 red LEDs fault

Electrical connections

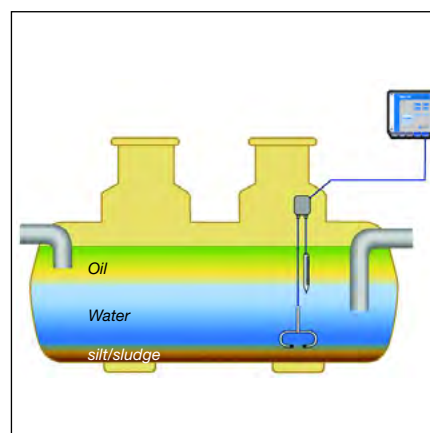
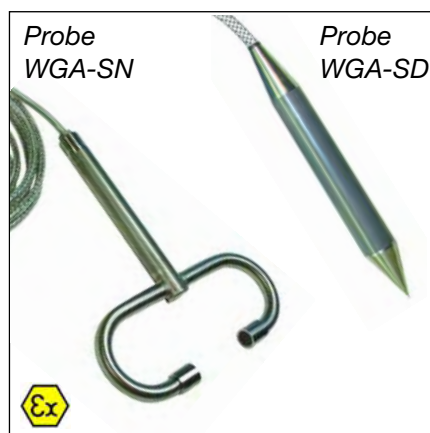
5 x cable gland M16

ATEX approvals

Probe WGA-AS:
 Ex II 1 G EEx ia II A T5

DG: E	Part no.	Price €
WGA 02 with probe WGA-SD	53400	
WGA 03 with probes WGA-SD, WGA-AS	53411	
Spare probe WGA-SD	53403	
Spare probe WGA-AS	53415	

Alarm units WGA 04/WGA 05 for oil, petrol and grease separators (silt alarm/layer level alarm)



Application

WGA 04 is a unit designed to provide alarm signals in oil, petrol and grease separators in which also silt and sludge accumulations occur. WGA 05 also detects the level of the layer of separated liquid and generates an alarm signal when it is necessary to empty and clean the separator.

Description

WGA 04 consists of an evaluation unit and an ultrasonic probe (WGA-SN). The probe generates an alarm signal when it detects solid matter between the two probe tips. The evaluation unit is equipped with 2 relay outputs, visual and audible alarms as well as test and re-set buttons. WGA 05 is equipped with an additional conductivity probe (WGA-SD) for monitoring the level of the separating layer. The WGA-SD probe is mounted below the constant level of the separator. As soon as the oil, petrol or grease layer reaches the critical level, the unit generates an alarm signal. The evaluation unit monitors the connected probes and signals short circuits or cable breaks in the probe circuits.

Technical specifications WGA 04

Operating temperature range

Medium: 0 °C/+60 °C
Ambient: -25 °C/+50 °C

Probe WGA-SN (silt)

Principle of operation: ultrasound
Length 315 mm, width 255 mm

Probe cable

PVC, oil-resistant, length 5 m

Distance probe - evaluation unit

Max. 300 m

Supply voltage

AC 230 V

Power consumption

approx. 2 VA

Relay outputs

Relay: 2 voltage-free changeover contacts
(1 can be reset)
Contact rating: AC 250 V/
5 A/100 VA

Visual indication

1 green LED normal operation
1 red LED alarm
1 red LED fault

Audible alarm

Integrated piezo-buzzer, re-settable

Operational test

Integrated test button

Housing

Wall mounting housing made from impact resistant plastic (polycarbonate)
W x H x D: 175 x 125 x 75 mm

Protection

IP 65 (EN 60529)

Electrical connections

4 x cable gland M16

ATEX approvals

Evaluation unit:

Ex II (1) G [EEx ia] II C

Probe WGA-SN:

Ex II 1 G EEx ia II B T5

Additional specifications WGA 05

Probe WGA-SD (layer level)

Principle of operation: conductivity
Length 214 mm, Ø 25 mm

Power consumption

approx. 4 VA

Visual indication

1 green LED normal operation
2 red LEDs alarm
2 red LEDs fault

Electrical connections

5 x cable gland M16

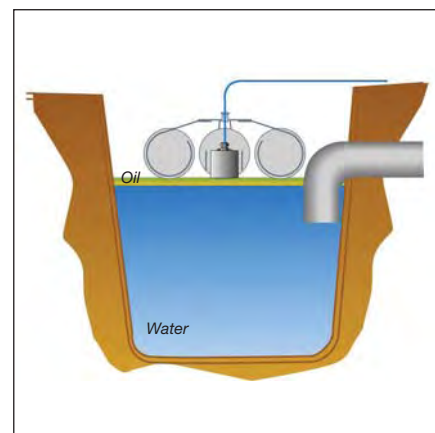
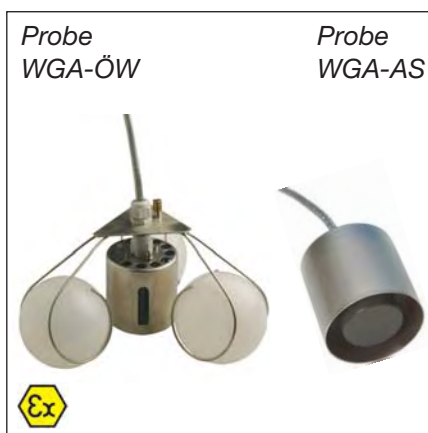
ATEX approvals

Probe WGA-SD:

Ex II 1 G EEx ia II A T4

DG: E	Part no.	Price €
WGA 04 with probe WGA-SN	53412	
WGA 05 with probes WGA-SN, WGA-SD	53413	
Spare probes WGA-SN	53416	
Spare probes WGA-SD	53403	

Alarm unit WGA 06 for oil, petrol and grease separators (oil-on-water alarm/overflow alarm)



Application

When used with the WGA-ÖW probe, WGA 06 detects accumulations of oil in separator sumps or shafts and generates an alarm before pollutants are discharged into the mains drainage system. It is also possible to connect the WGA-AS probe. It enables the detection of maximum levels in separators or retention tanks. This prevents overfilling that may be caused by clogged outlets or other circumstances. The unit keeps harmful substances from reaching the sewage water system.

Description

WGA 06 consists of an evaluation unit and a capacitance probe (WGA-ÖW or WGA-AS). The evaluation unit is equipped with 2 relay outputs, visual and audible alarms as well as test and re-set buttons. Either the floating probe WGA-ÖW or the fixed probe WGA-AS can be connected. WGA-ÖW floats on the surface of the water in the shaft and generates an alarm signal when an oil, grease or petrol layer of at least 15 mm thickness has built up. WGA-AS is mounted above the constant level of the separator or the retention tank. An alarm is triggered when the maximum permissible level is reached. The evaluation unit monitors the connected probes and signals short circuits or cable breaks in the probe circuits.

Technical specifications

Operating temperature range

Medium: 0 °C/+60 °C
 Ambient: -25 °C/+50 °C

Floating probe WGA-ÖW (oil-on-water)

Principle of operation: capacitance
 3 PVC floating balls
 Height 120 mm, Ø 370 mm

Probe WGA-AS (overflow)

Principle of operation: capacitance
 Length 81 mm, Ø 82 mm

Probe cable

PVC, oil-resistant, length 5 m

Distance probe - evaluation unit

Max. 300 m

Supply voltage

AC 230 V

Power consumption

approx. 2 VA

Relay outputs

Relay: 2 voltage-free changeover contacts (1 can be re-set)
 Contact rating: AC 250 V/ 5 A/100 VA

Visual indication

1 green LED normal operation
 1 red LED alarm
 1 red LED fault

Audible alarm

Integrated piezo-buzzer, re-settable

Operational test

Integrated test button

Housing

Wall mounting housing made from impact resistant plastic (polycarbonate)
 W x H x D: 175 x 125 x 75 mm

Protection

IP 65 (EN 60529)

Electrical connections

4 x cable gland M16

ATEX approvals

Evaluation unit:
 Ex II (1) G [Ex ia] II C
 Probes:
 WGA-ÖW: Ex II 1 G EEx ia II A T5
 WGA-AS: Ex II 1 G EEx ia II A T5

DG: E	Part no.	Price €
WGA 06 without probes	53414	
Floating probe WGA-ÖW, (oil-on-water)	53417	
Probe WGA-AS (overflow)	53415	

Chapter 4

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Leak detectors and leak monitoring systems, internal tank linings

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<i>Leak detection instruments, conductivity based (CoFox® ELT 8/ELT 500/4, probes BWS 11, WSS)</i>	89-90
<i>Oil-on-water detector, conductivity based (ÖAWD)</i>	91
<i>Leak alarm system TraceTek®</i>	92

Leak detectors - sight glass principle



Leak detectors - sight glass principle

Leak detectors for liquid systems for aboveground double-skinned tanks containing inflammable liquids and non-inflammable, water polluting liquids. Consisting of a transparent acrylic glass cylinder, wire mesh cylinder (only version E), housing covers made from stainless steel (versions 24, 39 and 72) or cast brass (version 230). LAS 24, LAS 39 and LAS 72 have a male G1 connection thread and LAS 230 has a female G1 connection thread. LAS 72 also with G1 connection at the side for 2 additional containers. Application under atmospheric conditions for steel tanks according to EN 12285-2, DIN 6618-3, DIN 6623-1 and DIN 6624-1. Types LAS 24 E and LAS 39 E for hazardous liquids according to

classes A I, A II, A III and B. Types LAS 24, LAS 39, LAS 72 and LAS 230 also for hazardous liquids according to class A III.

Technical Approval of the German Institute for Building Technology: Z-65.24-381.

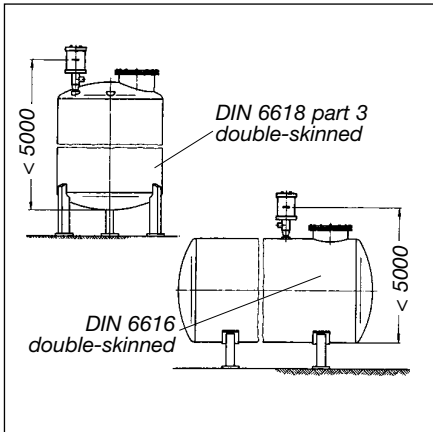
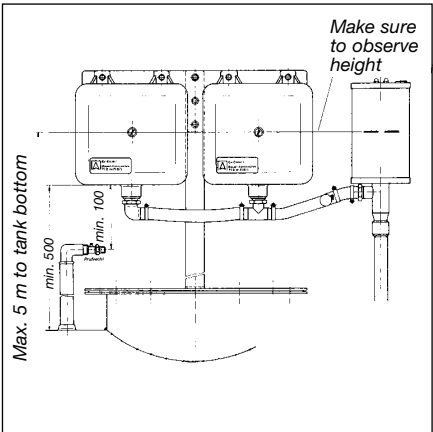
The usable contents of LAS 24 is 0.7 litres. LAS 24 is suitable for tanks with an interstitial space of up to 24 litres. The usable contents of LAS 39 is 1.1 litres; it can be fitted to tanks with an interstitial space of up to 39 litres. The usable contents of LAS 72 is 2.1 litres; it can be mounted to tanks with an interstitial space of up to 72 litres. With additional containers (4.5 litres each), LAS 72 can be used for leak detection on tanks with a greater interstitial space (max. number of additional tanks is 2, refer to table).

LAS 230 is suitable for tanks with an interstitial space of 230 l (25,000 to 40,000 l tanks with a diameter of 200 cm). LAS 24 EK with tilting valve for mobile tanks. The tilting valve protects against loss of leak monitoring liquid during transport and also serves for venting on site.

Number of additional containers	Usable contents of LAS 72 and additional container in litres	Max. amount of liquid (in litres) in monitoring space	Suitable for tanks with litre volumes
0	2.07	72.40	ap. 10,000
1	6.57	229.90	ap. 40,000
2	11.07	387.40	ap. 80,000

Please observe specifications of tank manufacturers

Extension kit for LAS 72 or LAS 72 E

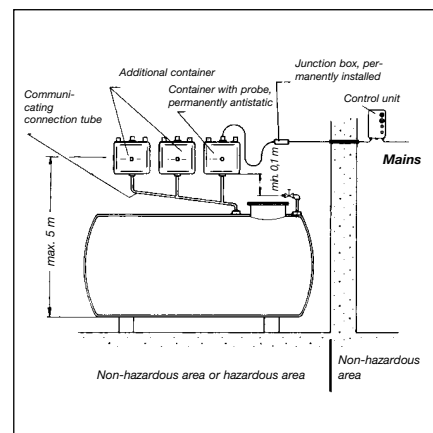


DG: H	Part no.	Price €
LAS 24	43515	
LAS 24 E	43516	
LAS 24 EK	43517	
LAS 39	43526	
LAS 39 E	43525	
LAS 72	43528	
LAS 72 E	43527	
LAS 230	43550	
Mounting kit LAS 0 (test valve)	43529	
Mounting kit LAS 1*	43530	
Mounting kit LAS 2*	43531	

* including the corresponding number of additional containers (Ex-Elstat I)

Leak detectors, intrinsically safe

according to ATEX, WHG and VbF



LAG-14 ER with relay

This class II (EN 13160-1: 2003) leak detector with an intrinsically safe probe circuit is designed for double-skinned tanks containing liquid in the interstitial space. The unit is designed for monitoring inflammable liquids of danger classes A I, A II, A III and B stored aboveground and non-inflammable water-polluting liquids. The system consists of a control unit, a container for leak monitoring fluid and a probe. CE-certified control unit with visual and audible alarms, test button and increased interference protection. With relay for connection of additional alarm equipment.

Approved for tanks according to EN 12285-1, EN 12285-2, DIN 6618-1, DIN 6619-1, DIN 6623-1, DIN 6624-1.

The container for leak monitoring fluid is made from antistatic plastic and can be mounted in hazardous areas of zones I and II (e.g. access chamber of petrol tanks). The control unit can be panel mounted using a special frame.

Technical Approval of the German Institute for Building Technology: Z-65.24-1

EC design type approval:
TPS 03 ATEX 15639 6
Ex II (1) G [EEx ia] IIC and [EEx ia] IIB

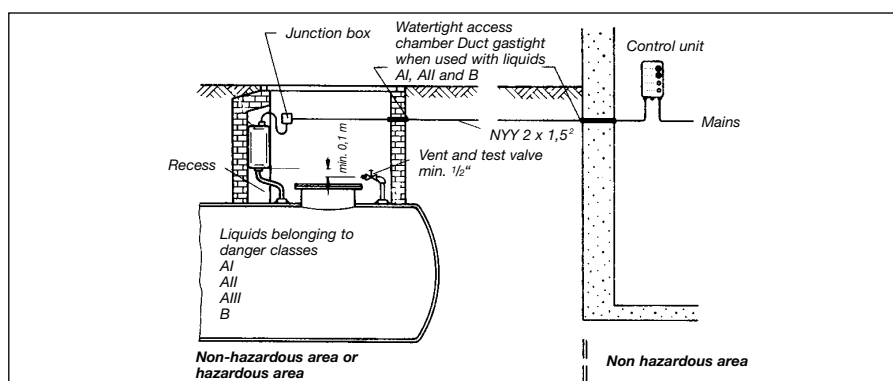
LAG container, black, intrinsically safe, without probe

The container for leak monitoring liquid serves as detection container and, at the same time, as an expansion vessel. Its usable contents amounts to 4.5 l (total contents 9 l). For underground tanks, the ratio between usable contents and total volume of leak monitoring fluid must be no more than 1:100. This means that if the liquid in the monitoring system exceeds 450 l (for tanks according to EN 12285-1 approx. more than 60,000 l), an additional container must be used. The maximum ratio for above-ground tanks and tanks with no more than 30 cm of earth coverage is 1:35 (i.e. for tanks according to EN 12285-1, EN 12285-2, approx. more than 20,000 l).

Important information:

As a result of the reclassification of water polluting substances in Germany, class WGK 0 for water polluting substances no longer exists. All substances previously assigned to WGK 0 now belong at least to class WGK 1. This means that since June 30, 2003, liquid based leak detectors may no longer be put forward for use on underground, double-skinned tanks. Legally existing installations may continue to be operated. Spare parts may be delivered. The reclassification does not affect liquid based leak detectors used on aboveground, double-skinned tanks. They continue to be compliant.

DG: G	PU	Part no.	Price €
LAG-14 ER with relay	5	43410	
LAG container black	1	40731	



Leak detectors, not intrinsically safe

according to WHG and VbF

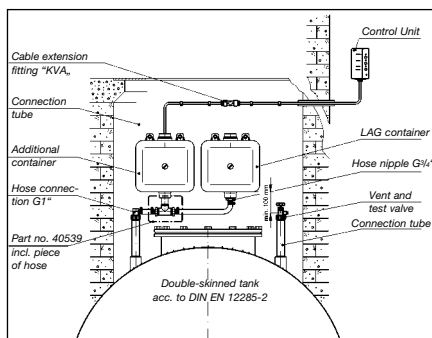


LAG-13 K (not intrinsically safe)

Class II (EN 13160-1: 2003) leak detector for double-skinned tanks with liquid in the interstitial space. The unit is designed for monitoring water polluting liquids and inflammable liquids of danger classes A I, A II, A III and B stored aboveground. The system consists of a control unit, a container for leak detection fluid and a probe. CE-certified control unit with visual and audible alarms, test button and increased interference protection. Approved for tanks according to EN 12285-1, EN 12285-2, DIN 6618-1, DIN 6619-1, DIN 6623-1, DIN 6624-1. The control unit can be panel mounted using a special frame. Technical Approval of the German Institute for Building Technology: Z-65.24-380

LAG-13 KR

Similar to LAG-13K, but with integrated relay. Voltage-free relay contact for connection of additional alarm equipment. Max. contact rating: AC 250 V 2A



LAG mounting kit

For approved mounting of leak detectors.



Mounting frame

For control panel mounting of AFRISO control units.

LAG container white

Not intrinsically safe, without probe.



Leak monitoring fluid - concentrate

10 l container with 4 l of leak monitoring fluid concentrate Antifrogen N, BAM no.: 1.3/9790-5.1/3436. Can be mixed with water to 8 l at up to -30 °C or to 10 l at up to -25 °C. Please enquire for larger containers.

Important information:

As a result of the reclassification of water polluting substances in Germany, class WGK 0 for water polluting substances no longer exists. All substances previously assigned to WGK 0 now belong at least to class WGK 1. This means that since June 30, 2003, liquid based leak detectors may no longer be put forward for use on underground, double-skinned tanks. Legally existing installations may continue to be operated. Spare parts may be delivered. The reclassification does not affect liquid based leak detectors used on aboveground, double-skinned tanks. They continue to be compliant.

DG: G	PU	Part no.	Price €
LAG-13 K (not intrinsically safe)	5	43500	
LAG-13 KR	1	43501	
LAG container white	1	40730	
Mounting frame	1	43520	
LAG mounting kit	5	40540	
Mounting kit for additional LAG container	1	40539	
Leak monitoring fluid - concentrate	5	43645	

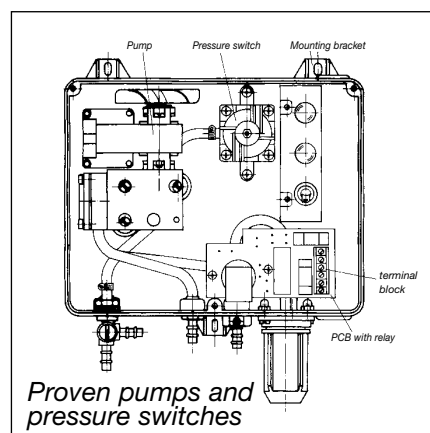
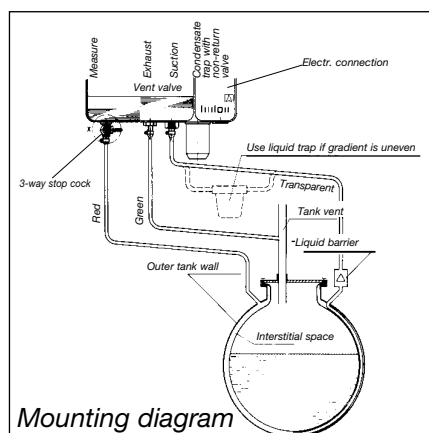
Spare parts for leak detectors

Spare parts for LAG and LAZ - when ordering spare parts, please provide us with the correct unit designation (refer to type designation plate on the control unit). Spare parts for discontinued models are also listed.

	Part no.	PU:	DG:	Price €
LAG probe, plug-in connection	40510	1	G	
Control unit LAG-14 ER	40642	1	G	
„Operation“ indicator lamp LAG-14 E Spare lamp with screw base E 10	40024	10	G	
„Operation“ indicator lamp LAG-14 E Spare lamp with plastic tube base	40019	10	G	
„Alarm“ indicator lamp LAG-14 E, LAG-13 Plug-in lamp, base W 2 x 4, 6d	40023	10	G	
Fuse LAG-14 E, LAG-14 ER, LAG-13, LAG-13 KR, LAG-10 Ke	40027	10	G	
Control unit LAG-13 K	40630	1	G	
Control unit LAG-13 KR	40638	1	G	
„Operation“ indicator lamp LAG-13, LAG-11 Spare lamp and plastic tube base	40019	10	G	
„Alarm“ indicator lamp LAG-13 E, LAG-11 12 V lamp and plastic tube base	40020	10	G	
„Alarm“ indicator lamp LAG-13 E, LAG-14 Plug-in lamp, base W 2 x 4, 6d	40023	10	G	
Fuse LAG-13 K	40026	10	G	
Foil keypad for control units 1996 and later	18 05 000002	1	G	
„Operation“ indicator lamp LAG-10 Ke (LWG-T) Yellow lamp with flying leads approx. 120 mm	40022	10	G	
„Alarm“ indicator lamp LAG-10 Ke (LWG-T) Red lamp with flying leads approx. 120 mm	40021	10	G	
Spare parts LAG mounting kit:				
Test valve plastic, complete	40555	1	G	
Double nipple G1	40556	1	G	
Hose connection G1 (angled)	40557	1	G	
Hose nipple G³/₄	40558	1	G	
Hose EPDM 14 x 3 (price per m)	40543	Please specify length	G	
LAZ spare parts:				
Pump with motor LAZ-04/1 (HV)	43651	1	H	
Pump with motor LAZ-04/3 (NV)	43652	1	H	
Pressure switch HV	43653	1	H	
Pressure switch NV	43654	1	H	
Complete PCB with relay	43639	1	H	
Non-return valve, complete	43657	1	H	
„Operation“ indicator lamp LAZ-04 (yellow)	43659	1	H	
„Alarm“ indicator lamp LAZ-04 (red)	43658	1	H	
„Operation“ indicator lamp LAZ-04 (green)	43661	1	H	

Vacuum type leak detectors

(according to WHG and VbF)



Eurovac 04-1 (LAZ-04/1)

Class I (EN 13160-1:2003) leak detector, high vacuum based, for use with double-skinned tanks and single-skinned tanks with internal lining. The unit is designed for monitoring aboveground and underground tanks containing inflammable liquids of danger class A III as well as non-inflammable, water polluting liquids. Also suitable for renovating double-skinned tanks which were previously monitored with leak detection fluid. (Refer to the operating instructions for a definition of the stored media).

Eurovac 04-1 is adjusted for an alarm vacuum level of 325 mbar and approved for tanks up to Ø 2.9 m whereby the suction tube connection may end at the top of the tank. If mounted outdoors, special installation requirements have to be observed, e.g. protective housing, greater internal capillary tube diameters (6 mm), condensate traps.

Application

For tanks according to EN 12285-1, EN 12285-2 design A, DIN 6618-2, 6619-1, 6623-1, 6624-1 as well as equivalent tanks made from steel or equivalent approved tanks made from plastic, provided that they have double walls or are equipped with an approved leak protection lining (internal lining) according to EN 12285-1 or by analogous application of EN 12285-1.

For tanks according to DIN 6625-1 which are equipped with an approved leak protection lining (internal lining) and cylindrical, rectangular or spherical tanks made from reinforced concrete or equivalent, approved tanks made from other materials which are equipped with an approved leak protection lining (internal lining).

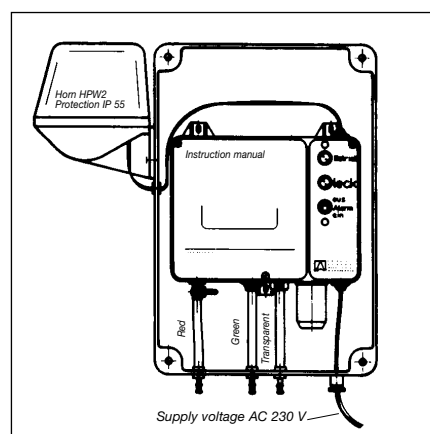
Technical Approval of the German Institute for Building Technology: Z-65.22-4

Eurovac 04-3 (LAZ-04/3)

This vacuum leak detector is similar to Eurovac 04-1 but is adjusted for an alarm vacuum level of 34 mbar and certified for tanks up to Ø 2.9 m; the suction pipe must run to the bottom of the tank.

Application

For tanks according to EN 12285-1, EN 12285-2 design A, DIN 6619-1, 6624-1, 6625-1 and equivalent tanks made from steel or equivalent, approved tanks made from reinforced concrete or equivalent, approved tanks made from other materials, equipped with an approved leak protection lining (internal lining). Technical Approval of the German Institute for Building Technology: Z-65.22-382



LAZ-04 in protective housing

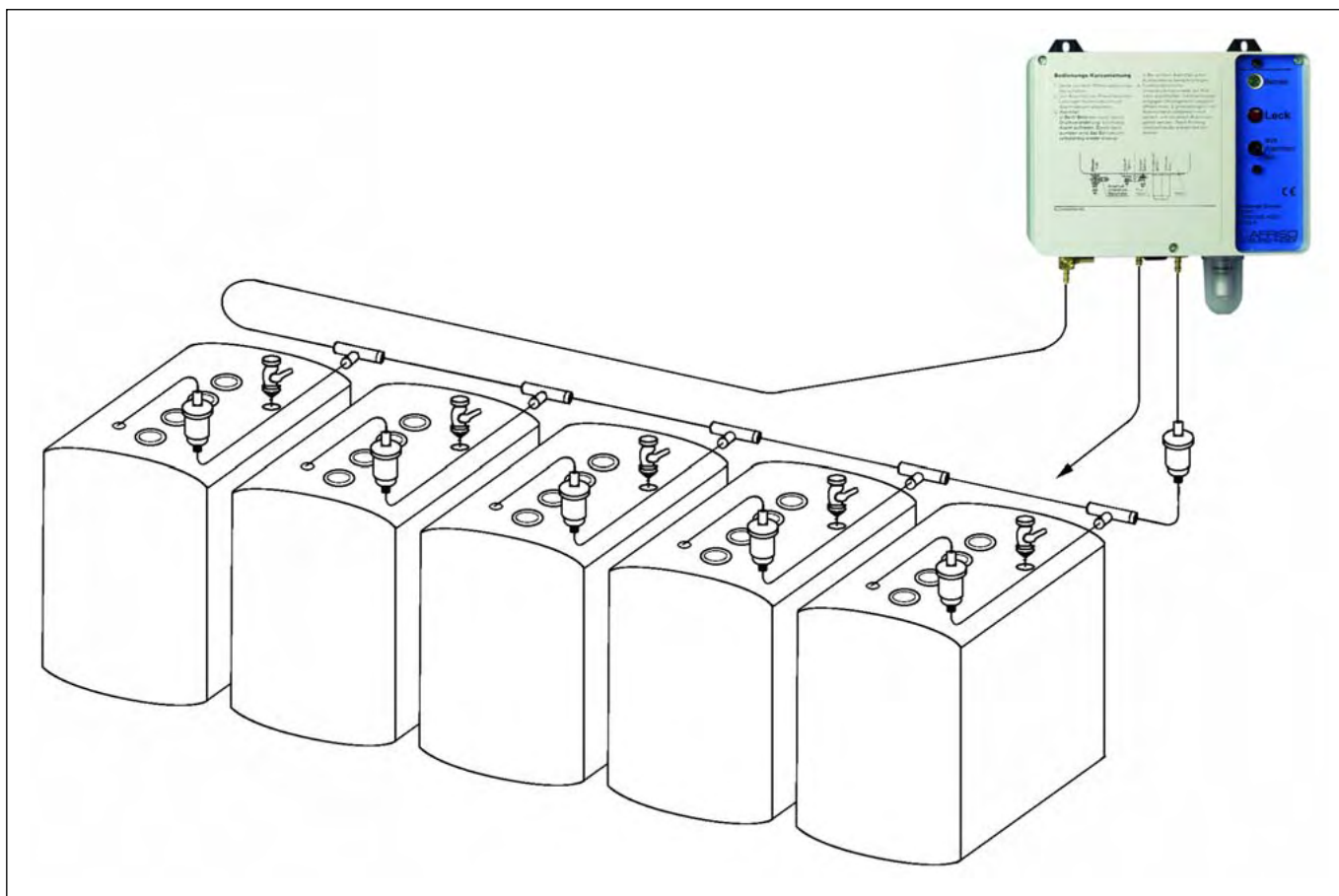
Vacuum type leak detector LAZ-04 in protective housing, pre-assembled and ready for connection, with horn HPW 2. Protection IP 55.

Refer to pages 78-82 for internal linings and a complete range of installation accessories.

Refer to page 453 for test instruments for vacuum type leak detectors.

DG: H; PU: 1	Part no.	Price €
Eurovac 04-1 (LAZ-04/1)	43641	
Eurovac 04-3 (LAZ-04/3)	43643	
LAZ-04/1 in protective housing	43665	
LAZ-04/3 in protective housing	43666	
Connection piece G1 x 4 mm internal diameter	43697	

Application example of leak detection on double-skinned battery tanks with vacuum type detectors



Application of vacuum type leak detector LAZ-04/1 on double-skinned plastic or steel tanks which are approved for leak detection with vacuum.

In this example, the LAZ-04/1 leak detector is used to monitor the storage of hazardous liquids class A III and non-inflammable, water-polluting liquids.

When planning such designs, observe the specific weight of the stored medium and the test pressure of the double-skinned tank. Up to 5 tanks can be monitored with one leak detector.

Test pressure gauge for double-skinned tanks



Test pressure gauge for monitoring the vacuum in double-skinned storage and transport tanks, consisting of a Bourdon tube glycerine filled pressure gauge RF 50 Gly -1/0 bar D 601, adapter with hollow screw for mounting to the tank, 3-way stop cock with hose connections for suction pump or pressure gauge.

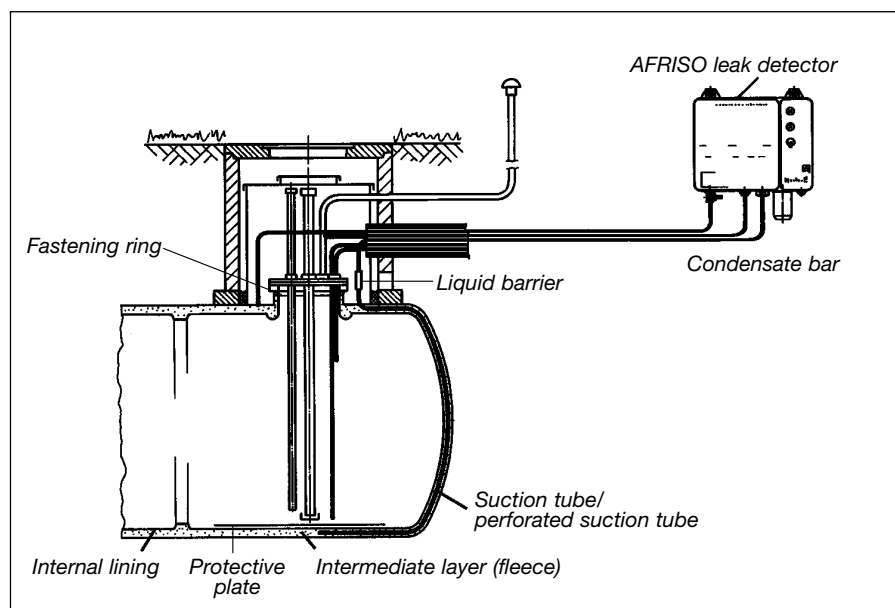
Dial can be customised, e.g. with coloured areas or company logo.

DG : M

Part no.	Price €
67002	
Minimum order quantity 50 pieces	

Internal tank linings with complete accessories

and Technical Approval of the German Institute for Building Technology. For fuel oil EL and diesel



Tank protection package AK-S for cylindrical DIN tanks

Litres	Part no.	DG:	Price €
3,000	43901.003	H	
5,000	43901.005	H	
7,000	43901.007	H	
10,000	43901.010	H	
13,000	43901.013	H	
15,000	43901.015	H	
16,000	43901.016	H	
20,000	43901.020	H	
25,000	43901.025	H	
30,000	43901.030	H	
40,000	43901.040	H	
50,000	43901.050	H	
60,000	43901.060	H	
80,000	43901.080	H	
100,000	43901.100	H	

Technical Approval of the German Institute for Building Technology: Z-65.30-162 (Percentage of biodiesel up to 20 % if fleece is used as intermediate layer)

A tank protection package comprises the following:

Eurovac vacuum leak detector, internal tank lining according to DIN or custom-made (please enquire for dimensional drawings), 1 pair of felt overshoes, intermediate layer (fleece), protective plate and all required mounting accessories as per list (refer to page 82). If the tank is outdoors and above-ground, install 6 x 2 mm capillary tubing and use fittings with 6 mm connections (please mark accessories list accordingly).

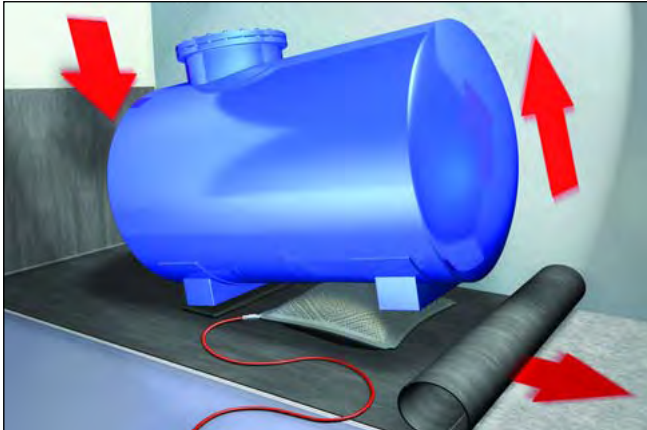
Prices for spherical and other tank shapes on request.

Tank protection package AK-S for rectangular tanks

Up to... Litres	Part no.	DG:	Price €
3,000	43902.003	H	
4,000	43902.004	H	
5,000	43902.005	H	
6,000	43902.006	H	
7,000	43902.007	H	
8,000	43902.008	H	
9,000	43902.009	H	
10,000	43902.010	H	
11,000	43902.011	H	
12,000	43902.012	H	
13,000	43902.013	H	
14,000	43902.014	H	
15,000	43902.015	H	
16,000	43902.016	H	
17,000	43902.017	H	
18,000	43902.018	H	
19,000	43902.019	H	
20,000	43902.020	H	
21,000	43902.021	H	
22,000	43902.022	H	
23,000	43902.023	H	
24,000	43902.024	H	
25,000	43902.025	H	
26,000	43902.026	H	
27,000	43902.027	H	
28,000	43902.028	H	
29,000	43902.029	H	
30,000	43902.030	H	

Technical Approval of the German Institute for Building Technology: Z-65.30-162

Tank room lining for fuel oil and diesel storage



For lining of drip pans and for rooms used for the storage of water polluting liquids.

A tank room lining package consists of foil, aluminium tape, geotextiles and nail dowels. Approved for fuel oil EL and diesel oil. Technical Approval of the German Institute for Building Technology: Z-59.21-77 and Z-59.21-78

Please specify room dimensions when ordering.

Legislation like the German Water Act (WHG and VAWs) contains stringent requirements regarding the safety and leak proof aspect of storage rooms and drip pans for aboveground storage tanks. Many older tank rooms no longer provide the required safety levels due to cracks in walls or floors, inadequate coating or other damages.

AFRISO special foil tank room linings ensure cost effective and permanent environmental protection for new or renovated tank rooms.

The tank contents is pumped into an intermediate storage facility. The supply of the heating system is not interrupted. The empty tanks are then lifted up. The lining which is manufactured to the exact tank room dimensions is then laid down. The foil is then fixed to the wall and

hard rubber discs are placed under the tanks to prevent damage to the foil. The tanks are then refilled.

- The special foil is suitable for all tank types and sizes.
- During the work process the tank is not removed but lifted using special lifting gear, air cushions or similar. Battery tanks, however, can be removed and re-installed easily.
- There are no special requirements concerning the wall and floor surfaces. The protective foil covers cracks and adapts to uneven surfaces.
- Extensive preparation work in the tank room is not required.
- The lining can be installed during any season since the heating is not interrupted.
- The tank room lining is delivered as a complete package.
- Optional leak detectors can be installed.

Tank room foil

Dimensions

Thickness 1.5 mm

Approval

Technical Approval of the German Institute for Building Technology: Z-59.21-77 and Z-59.21-78. For fuel oil EL and diesel

Synthetic geotextiles, white

Dimensions

W 250 cm x running metre

Aluminium tape

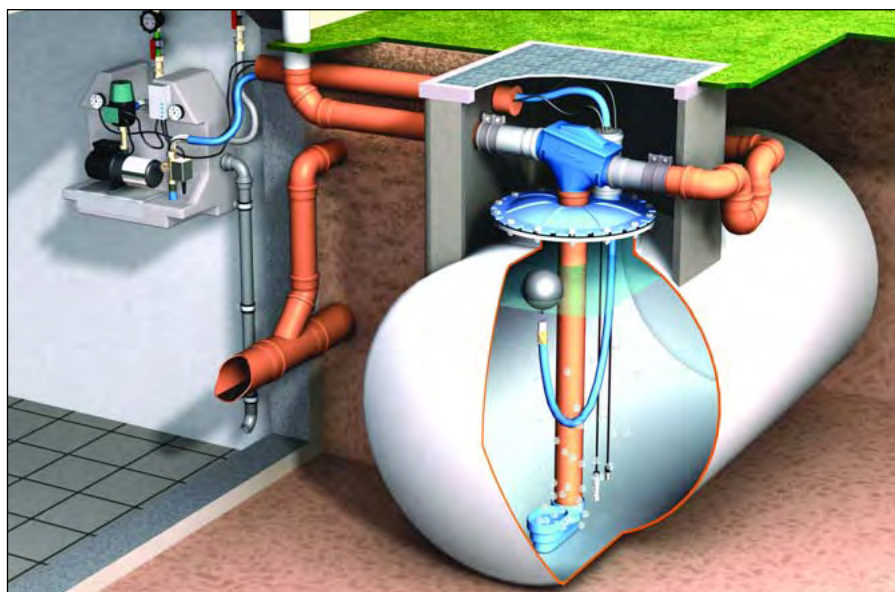
Dimensions

30 x 3 mm x running metre for fastening of foil at upper edge



DG: H	Part no.	Price €
Tank room lining, per m²	43868	
Synthetic geotextiles, per m²	43965	
Aluminium tape, per metre	43934	
Nail dowel, per piece (4 per metre)	43617	

Internal linings for rain water harvesting



Other tanks, cisterns, sumps, etc. can also be lined and converted into suitable storage facilities using internal linings. Please enquire.

DG: H	Part no.	Price €
Liquid water foil, black, 5024, can of 2 litres	43786	

Internal lining for cylindrical tanks

Litres	Part no.	DG:	Price €
3,000	43887.003	H	
5,000	43887.005	H	
7,000	43887.007	H	
10,000	43887.010	H	
13,000	43887.013	H	
15,000	43887.015	H	
16,000	43887.016	H	
20,000	43887.020	H	
25,000	43887.025	H	
30,000	43887.030	H	
40,000	43887.040	H	
50,000	43887.050	H	
60,000	43887.060	H	
80,000	43887.080	H	
100,000	43887.100	H	

When old heating oil tanks are taken out of service because of corrosion, or when a fuel heating system is converted to another type of fuel, it may be a good idea to use the existing tank to collect rain water and to integrate it into a rain water harvesting system. For this purpose, the tank is cleaned and then fitted with a special internal lining suitable for water. The old, standardised manhole cover (Ø 500 mm) is replaced with a plastic manhole cover which is especially designed for rain water systems (refer to page 144). This simplifies the conversion. It is advisable to install a vacuum type leak detector, but this is not mandatory. Please select accessories as required (refer to page 82).

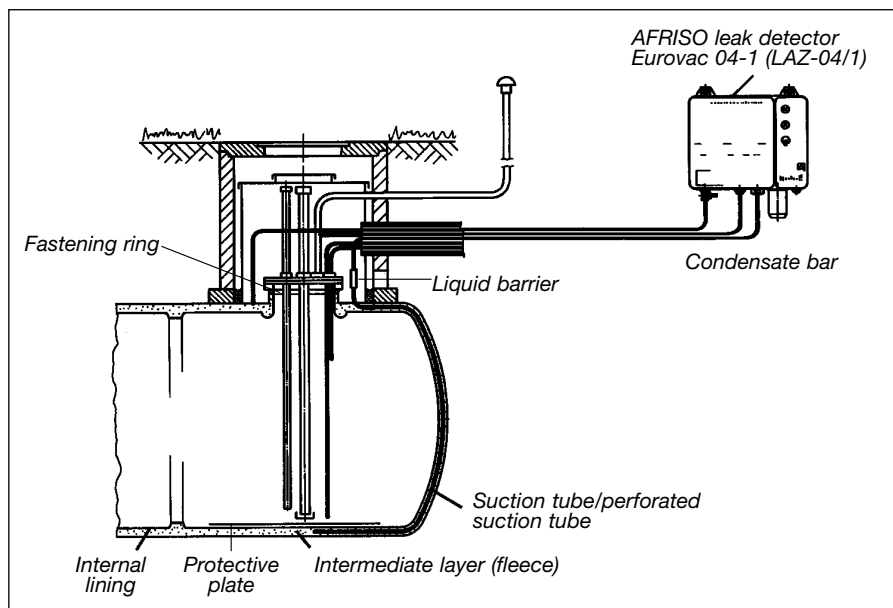
Internal lining for rectangular tanks

Up to... litres	Part no.	DG:	Price €
3,000	43888.003	H	
4,000	43888.004	H	
5,000	43888.005	H	
6,000	43888.006	H	
7,000	43888.007	H	
8,000	43888.008	H	
9,000	43888.009	H	
10,000	43888.010	H	
11,000	43888.011	H	
12,000	43888.012	H	
13,000	43888.013	H	
14,000	43888.014	H	
15,000	43888.015	H	
16,000	43888.016	H	
17,000	43888.017	H	
18,000	43888.018	H	
19,000	43888.019	H	
20,000	43888.020	H	
21,000	43888.021	H	
22,000	43888.022	H	
23,000	43888.023	H	
24,000	43888.024	H	
25,000	43888.025	H	
26,000	43888.026	H	
27,000	43888.027	H	
28,000	43888.028	H	
29,000	43888.029	H	
30,000	43888.030	H	

Please enquire for larger linings.



Internal linings for liquid fertiliser AHL, AdBlue



Ensure that all relevant directives concerning construction and the selection of materials are complied with.

Leak protection lining for cylindrical DIN tanks or tanks manufactured on site consisting of steel, glass-fibre reinforced plastic or asbestos cement. With test certificate from the German Federal Institute for Materials Testing and Research BAM VI.2/10320/01. For storing liquid fertiliser AHL and urea solution 32.5 % AdBlue. When AdBlue is stored, the surface temperature must not exceed 35 °C. Made of PVC foil E 3855, 0.80 mm thick, resistant to liquid fertiliser.

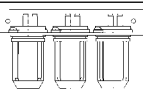
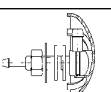
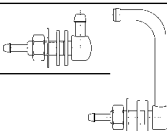
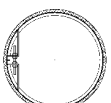
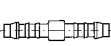
	Part no.	DG	Price €
Internal linings for liquid fertiliser AHL and AdBlue for rectangular tanks Per m ²	43870	H	
Additional cost for additional manhole Different and specially dimensioned manhole sizes are also available at short notice with a 5 % surcharge.	08027	H	
Stainless steel fastening ring Complete with round gasket, foam rubber and cardboard gasket, 500 mm diameter. As accessory for AdBlue on request.	43900K	H	
Stainless steel fastening ring Complete with round gasket, foam rubber and cardboard gasket, 600 mm diameter As accessory for AdBlue on request.	43900L	H	

Internal linings for AHL and AdBlue for cylindrical DIN tanks

Litres	Part no.	DG	Price €
2,000	43880.002	H	
3,000	43880.003	H	
4,000	43880.004	H	
5,000	43880.005	H	
6,000	43880.006	H	
7,000	43880.007	H	
8,000	43880.008	H	
9,000	43880.009	H	
10,000	43880.010	H	
11,000	43880.011	H	
12,000	43880.012	H	
13,000	43880.013	H	
14,000	43880.014	H	
15,000	43880.015	H	
16,000	43880.016	H	
20,000	43880.020	H	
25,000	43880.025	H	
30,000	43880.030	H	
40,000	43880.040	H	
50,000	43880.050	H	
60,000	43880.060	H	
80,000	43880.080	H	
100,000	43880.100	H	

Please enquire for larger linings and other shapes.

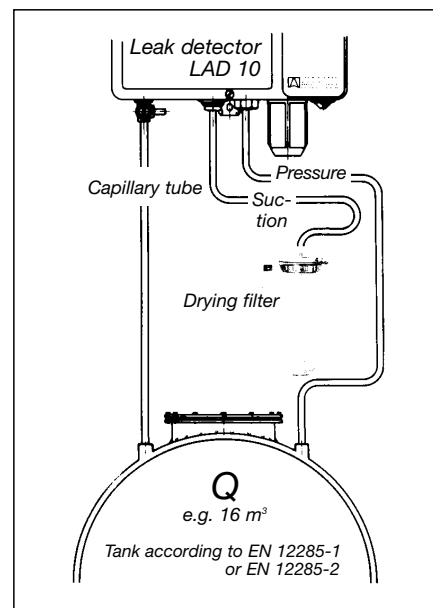
Mounting accessories for internal linings for fuel oil EL and diesel

Figure	Designation	Part no.	Specification	Pieces/pack			Single unit order PU	Price € DG: H
				Please tick				
4 Ø	6 Ø							
	Condensate bar	43692 43693	Connections 4 mm Connections 6 mm	1	1		10 10	
	Liquid barrier with condensate trap and bracket	43646 43638	Connections 4 mm Connections 6 mm	1	1		10 10	
	Angled nipple with spacer	43904 43905	6 x 4 mm 6 x 6 mm	1	1		25 10	
	Angled nipple short	43906 43907	6 x 4 mm 6 x 6 mm	1	1		25 10	
	Angled nipple long	43908 43909	6 x 4 mm 6 x 6 mm	1	1		10 10	
 a)	a) Suction hose perforated	43910	6 x 3 mm			1	1 (Roll 100m)	
 b)	b) Suction hose not perforated	43911	6 x 3 mm			1	1 (Roll 100m)	
	Fastening ring with round gasket, foam rubber and cardboard gasket	43900A	Ø 500 mm			1	5	
		43900B	Ø 550 mm			1	5	
		43900C	Ø 600 mm			1	5	
		43900D	Ø 620 mm			1	5	
	Hose connector for suction hose	43945 43912	4 x 4 mm 6 x 6 mm			1 1	25 25	
		43944 43913	4 x 4 x 4 mm 6 x 6 x 6 mm			1 1	25 25	
	Hose connector	43914	G ³ / ₈ x 4 mm	1			25	
		43915	G ³ / ₈ x 6 mm		1		10	
		43916	G ¹ / ₈ x 4 mm	1			25	
		43917	G ¹ / ₈ x 6 mm		1		10	
	Plate holder	43918	With plate and clamp			1	10	

Please order separately (not included in package):

	PVC hose red 100 m	43648 43662	4 x 2 mm 6 x 2 mm				1 1	
	PVC hose green 100 m	43649 43663	4 x 2 mm 6 x 2 mm				1 1	
	PVC hose transparent 100 m	43650 43664	4 x 2 mm 6 x 2 mm				1 1	
	Sealing material 1 kg	43919	Eppl 28				1	
	Glue 1 kg	43920	Eppl 4851				1	
	Overpressure device	20466	G ¹ / ₂ Release pressure approx. 25 mbar				25	DG: G
Polystyrene bar for T profiles		43927	1 m				50	
	Foam rubber roll 10 m	43926	50 x 5 mm				1	
	Foam rubber roll 10 m	43942	50 x 8 mm				1	
	Mipoplast floor plate	43928	800 x 800 mm				1	

Pressure type leak detectors for double-skinned tanks



Europress LAD-10

Pressure type leak detector for double-skinned tanks. Used for water polluting, non-inflammable liquids and hazardous inflammable liquids of classes A I, A II, A III and B. LAD 10 switches on the alarm when the monitoring pressure falls below 465 mbar. The integrated safety valve prevents the pressure from exceeding 570 mbar. Designed for installation in dry, accessible, frost-free rooms. Pressure type leak detectors are operated with dried air (10 % relative humidity). Drying filters with replaceable drying beads are used to dry the air.

Please order the drying filter separately.

Technical Approval of the German Institute for Building Technology:
Z-65.23-3

Application for double-skinned tanks without pressure in the storage space:

- According to EN 12285-1; EN 12285-2 design A; DIN 6619-2; DIN 6623-2; DIN 6624-1.
- Without leak detection fluid in the interstitial space.
- Ground water level up to 1,450 mm above the tank top permissible.
- Tank diameter or tank in m

Permissible density of height the liquid in t/m ³	
≤ 2.00	≤ 1.90
≤ 2.50	≤ 1.74
≤ 2.60	≤ 1.67
≤ 2.76	≤ 1.58
≤ 2.84	≤ 1.53
≤ 2.90	≤ 1.50

Technical specifications

Operating temperature range
Ambient: -5 °C/+50 °C

Connection
suction/pressure/capillary
For capillary tubing 6 x 2 mm

Supply voltage
AC 230 V

Power consumption
100 VA

Switching output
Relay contact: 1 voltage-free changeover contact
Contact rating: 250 V, 2 A (resistive load)

Housing
Wall mounting housing made from impact resistant plastic (ABS)
W x H x D: 215 x 165 x 100 mm

Protection
IP 30 (EN 60529)

LAD-10 in protective housing

LAD-10 in protective housing, completely pre-assembled and ready for connection, with horn HPW 2. Protection IP 55.

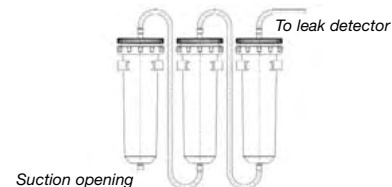
LAD-10 in protective housing, heated

For outdoor installation. Housing features thermostat heating. LAD completely pre-assembled and ready for connection. Horn HPW 2 installed outside. Protection IP 55.

Number of drying filters for underground tanks:
1 x drying filter type TF 220

Number of drying filters for aboveground tanks:

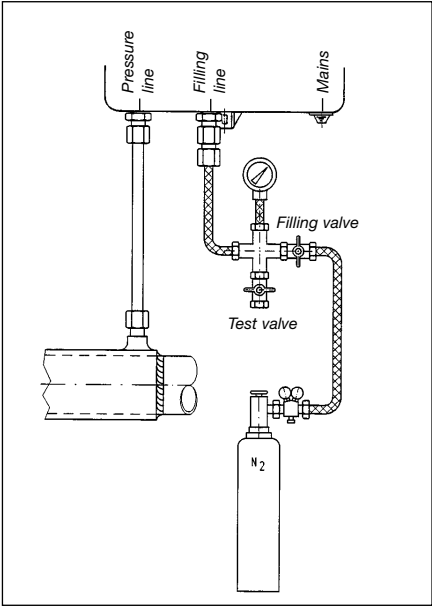
Interstitial space volume	No. of drying filters
to 300 Litres	1 x TF 220
to 700 Litres	2 x TF 220
to 1,000 Litres	3 x TF 220
to 1,500 Litres	4 x TF 220
to 1,800 Litres	5 x TF 220
to 2,200 Litres	6 x TF 220
to 2,600 Litres	7 x TF 220
to 3,000 Litres	8 x TF 220



DG: H; PU: 1	Part no.	Price €
Europress LAD-10	43680	
LAD-10 in protective housing	43681	
LAD-10 in protective housing, heated	43679	
Drying filter TF 220 with bracket	43688	
Drying beads 850 ml	69226	
Connection piece G1 x LW 6 mm internal diameter	43698	

Refer to page 82 for PVC capillary tubing 6 x 2.

Pressure type leak detectors for double-skinned pipes



Europress LAD-R

Leak detector for monitoring double-skinned pipes using pressure with inert gas (e.g. nitrogen), without stationary supply cylinder. To be used on double-skinned pipes carrying water polluting, non-inflammable liquids and hazardous inflammable liquids of classes A I, A II, A III and B.

The double-skinned pipes must be suitable for the following pressures:

- In the interstitial space: ≤ 21 bar
- In the inner pipe: ≤ 16 bar

The monitoring pressures for „Alarm On“ and „Alarm Off“ can be adjusted via the two contacts of the integrated pressure gauge. Factory settings:

„Alarm On“ = 2 bar,
„Alarm Off“ = 6 bar.

The monitoring pressure for Alarm „ON“ must be at least 1 bar greater than the maximum operating pressure in the inner pipe. The switch point „Alarm Off“ can be set to a maximum of 21 bar.

The pressure gauge continuously measures the pressure in the interstitial space of the pipe. If the total interstitial space volume does not exceed 1,200 l, several interstitial spaces can be connected to one leak detector. Refer to page 85 for distributor bars. A nitrogen cylinder with pressure reducer is connected to the test coupling of the leak detector via a filling and test fitting (please order separately) to fill the interstitial space with inert gas. The filling pressure must not exceed 21 bar. After filling, the fitting is removed. If the pressure in the interstitial space falls below the adjusted threshold for „Alarm On“, the unit generates audible and visual alarms. Additional equipment such as audible and visual alarms, telecommunication and event reporting systems can be connected to the relay contact (1 voltage-free changeover contact).

Technical specifications

Supply voltage: AC 230 V

Power consumption: Max. 7 VA

Output:

1 voltage-free changeover contact

Contact rating: AC 250 V, 2 A

Housing: Impact resistant plastic

W x H x D: 215 x 165 x 100 mm

Protection: IP 30 (EN 60529)

Connection pressure pipe:

Copper capillary tubing Ø 6 x 1 mm

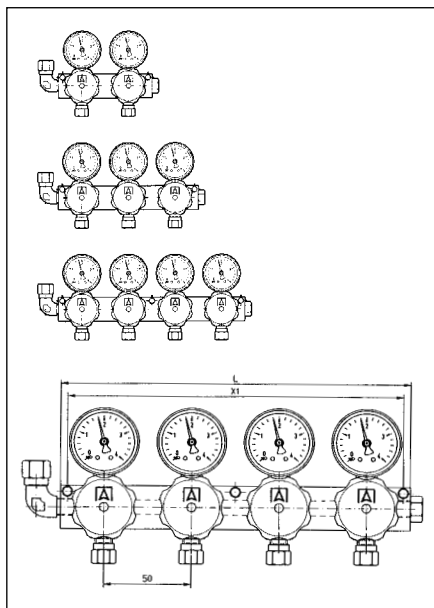
Filling pipe: Plug connector DN 5

Technical Approval of the German Institute for Building Technology:
Z-65.26-257

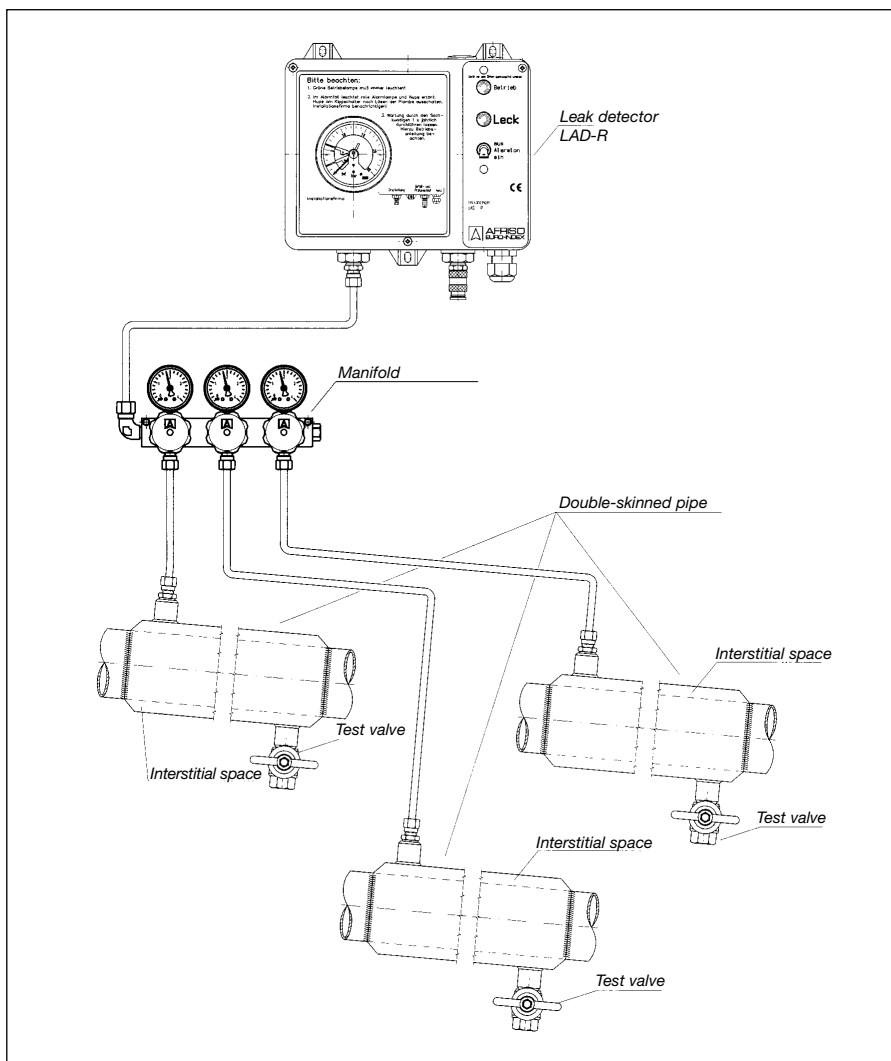
Permissible operating pressure	≤ 1 bar	1 bar to ≤ 10 bar	10 bar to ≤ 16 bar
„Alarm On“	2 bar	11 bar	17 bar
„Alarm Off“ (minimum filling pressure)	6 bar	15 bar	21 bar
Max. filling pressure for leak monitoring medium	21 bar	21 bar	21 bar

DG: H; PU: 1	Part no.	Price €
Europress LAD-R	43684	
Filling and test fitting, for pressure type leak detector LAD-R	43691	
Pressure reducer with safety valve, reducer group for nitrogen cylinders	43695	
LAD-R in protective housing, completely pre-assembled and ready for connection, with horn HPW 2. Protection IP 55	43694	
Please enquire for heated protective housing.		

Manifolds for LAD-R

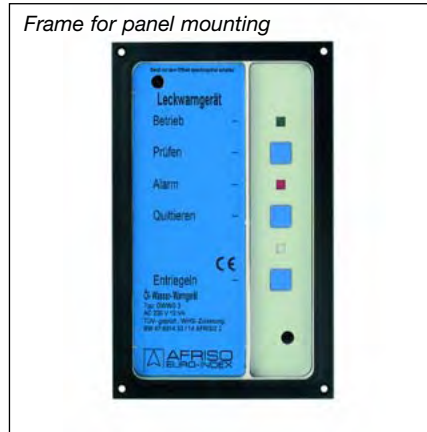


Manifolds for LAD-R are made from brass and feature a shut-off valve. They can be supplied with or without a pressure gauge (accuracy class 1.6). The manifolds are suitable for connection and monitoring of several double-skinned pipes simultaneously using pressure with inert gas (e.g. nitrogen) with a single leak detector. The total interstitial space volume must not exceed 1,200 l. Pressure connection via copper capillary tubing $\varnothing 6 \times 1$ mm. The pressure gauge is mounted between the stop cock and the interstitial space. In a test situation or in the event of a leak, the stop cocks can be closed so that the leaking pipe can be identified by the pressure drop indicated by the corresponding pressure gauge.



			Part no.	PU	DG	Price €
	X1	L				
Manifold bar 4 with press. gauge 25 bar	192	200	43834	1	H	
Manifold bar 4 with press. gauge 16 bar	192	200	43833	1	H	
Manifold bar 4 without press. gauge	192	200	43830	1	H	
Manifold bar 3 with press. gauge 25 bar	142	150	43829	1	H	
Manifold bar 3 with press. gauge 16 bar	142	150	43828	1	H	
Manifold bar 3 without press. gauge	142	150	43825	1	H	
Manifold bar 2 with press. gauge 25 bar	92	100	43824	1	H	
Manifold bar 2 with press. gauge 16 bar	92	100	43823	1	H	
Manifold bar 2 without press. gauge	92	100	43820	1	H	

Leak detection instruments, PTC thermistor based



Applications

- Oil storage rooms
- Drip pans
- Inspection ducts
- Ducts, protective pipes
- Access chambers
- Pipelines
- Heating rooms
- Water transfer rooms
- Laundry rooms

Oil/water alarm unit ÖWWG 3

The PTC thermistor oil or water alarm unit sets off visual and audible alarms in the event of accumulations of liquids which can be caused by tank leaks, backpressure, flooding, etc. The unit consists of an indicator with built-in operation and alarm lamps, a buzzer with mute facility as well as a flexible PTC thermistor probe. The PTC thermistor probe is mounted at the lowest point of the area to be monitored. The alarm is triggered when the probe comes into contact with liquid.

The indicator is designed for wall mounting in dry rooms. It can also be mounted in panels or control cabinets using a special mounting frame.

Technical specifications

Supply voltage: AC 230 V

Power consumption: Max. 10 VA

Output:

1 voltage-free changeover contact

Contact rating: AC 230 V, 2 A

Housing: Wall mounting housing made from impact resistant plastic (ABS)

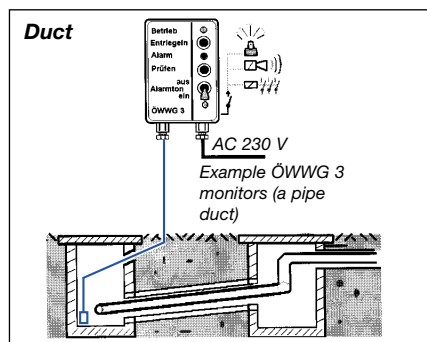
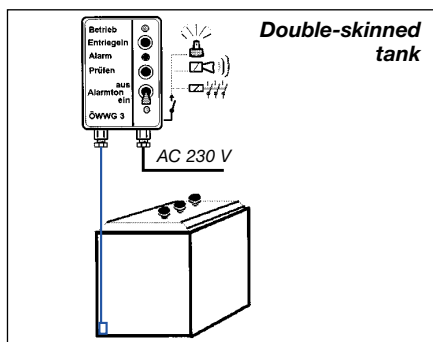
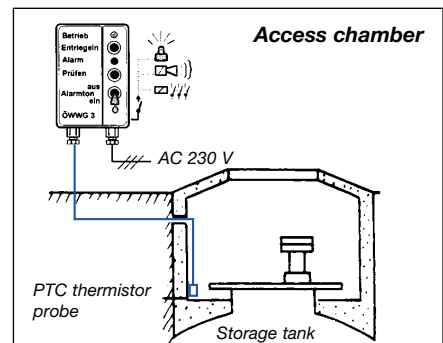
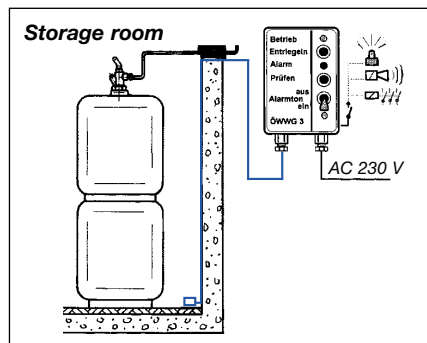
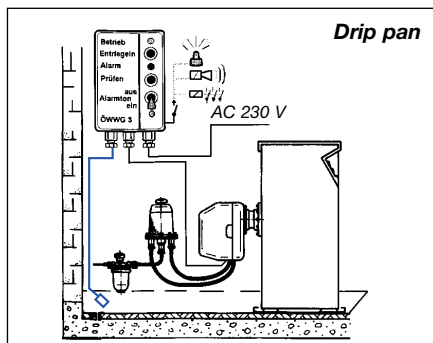
W x H x D: 97 x 163 x 62 mm

Protection: IP 30 (EN 60529)

Technical Approval of the German Institute for Building Technology:
Z-65.40-339

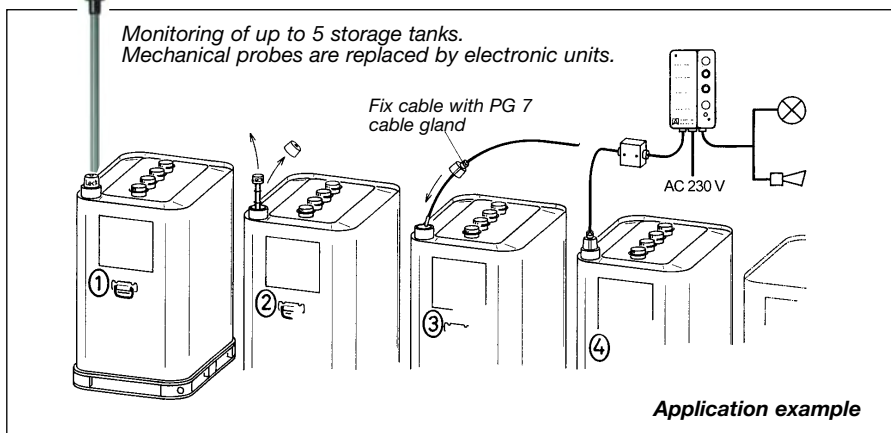
- Self-checking probe
- Alarm when in contact with liquid
- Alarm in the event of cable damage or probe damage
- Robust PTC thermistor probe
- Test button for easy function check
- Alarm memory with voltage-free contact (pump off)
- Built-in alarm buzzer with mute facility
- Fixed connection ensures safety
- Suitable for use with AFRISO series of safety devices

Application examples



DG: G; PU: 1	Part no.	Price €
Oil / water alarm unit ÖWWG 3	44510	
Spare probe ÖWWG 3	44516	
Probe fuse	44495	
Main fuse	10820	

Leak detection instruments with photoelectric probes, drip pans



Oil alarm OM5

Oil alarm OM5 in connection with 1 to 5 photoelectric probes for the detection of heating oil EL, L, M, diesel oil (danger class A III), low viscosity lubricating oil, motor oil, gearbox oil, hydraulic oil, vegetable oil and transformer oil. OM5 is an indicator unit with integrated operation and alarm lamps, buzzer with mute facility and output relay. The photoelectric probes are mounted in the areas to be monitored. The unit indicates which probe triggered an alarm. The oil alarm is designed for wall mounting in dry rooms. It can also be mounted in panels or control cabinets using a special mounting frame. The photoelectric probes must be ordered separately.

Technical specifications

Supply voltage: AC 230 V

Power consumption: 5 VA

Output:

1 voltage-free changeover contact

Contact rating: AC 230 V, 2 A

Response time: 2 seconds

Dimensions (W x H x D):

97 x 163 x 62 mm

Protection: IP 30 (EN 60529)

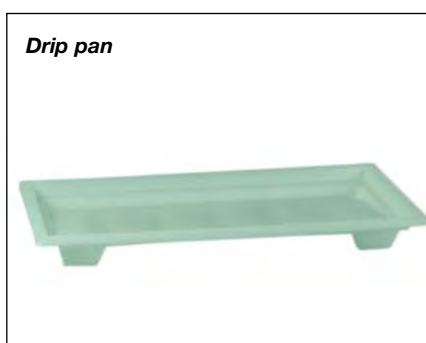
Technical Approval of the German Institute for Building Technology:
Z-65.40-214

Water alarm WM5

Leak detection instrument similar to OM5, but designed for the detection of water.

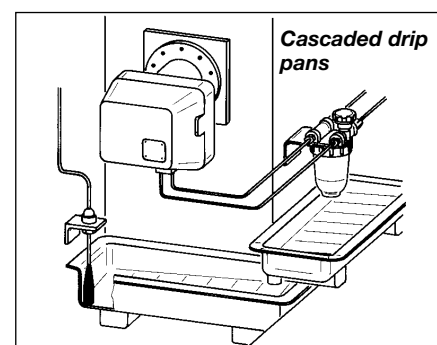
Photoelectric probe

Photoelectric probe for the detection of liquids, to be used with OM5 and WM5. Diameter 10 mm, response level 5 mm, cable length 10 m.

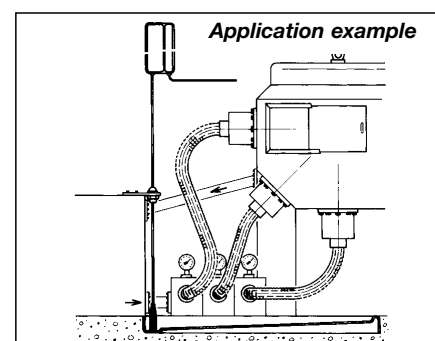


Drip pan

Drip pan made from white plastic (PE), dimensions 600 x 300 mm for collecting liquids such as oil. The drip pans are cascable (in a line or at 90° angles). At the lowest part of the drip pan the sensor of an oil alarm such as ÖWWG 3 (part no. 44510) or OM5 (part no. 44502) can be installed. Drip pans should be mounted below all oil fittings such as filters, oil vents, burners, etc. to prevent damage resulting from escaping oil and in order to detect leaks as early as possible. If the drip pan cannot be checked daily or is not easily accessible, oil alarms with audible and visual signals are recommended.

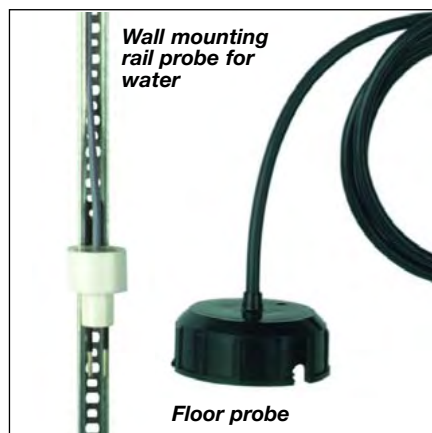


A mounting clamp for the sensor is supplied with the drip pan. Several cascaded drip pans can be monitored using a single probe. Several independent drip pans can be monitored with a single oil alarm OM5 and several probes.



DG: G; PU: 1	Part no.	Price €
Oil alarm OM5	44502	
Water alarm WM5	44508	
Photoelectric probe	44503	
Drip pan	44512	

Water alarms and oil/water alarms



Water alarm WWG1

In wall mounting housing. WWG1 is used together with a special floor probe for the detection of minute amounts of electrically conducting liquids such as water. The response level of the floor probe shipped with the alarm is approx. 2 to 3 mm. Water resulting from clogged drains, rain water, broken pipes, waste water pump failure, etc. causes the unit to trigger visual and audible alarms. The unit features two voltage-free output relays. One relay can be re-set (external audible alarm) the other relay is not re-settable (external alarm lamp, solenoid valve, pump). The instrument is suitable for panel mounting using a mounting frame (refer to page 74).

Water alarm WWG2

Similar to WWG1, but with height adjustable wall mounting rail probe.

Technical specifications

Control unit:

Supply voltage: AC 230 V

Power consumption: 5 VA

Output relay:

1 changeover contact

1 normally open contact (re-settable)

Contact rating: Max. AC 250 V, 2 A

Protection class: II

Protection: IP 30 (EN 60529)

Noise suppression:

According to EN 50081-1

Noise immunity:

According to EN 50082-2

Weight: 0.5 kg

Dimensions (W x H x D):

97 x 163 x 62 mm

Floor probe:

Response level approx. 2-3 mm

Dimensions (Ø x L): 75 x 40 mm

Wall mounted rail probe:

Height adjustable by approx. 200 mm

W x H x D: 40 x 300 x 55 mm

Standard probe cables: 1.5 m

Max. length 50 m (screened)

Principle of operation:

Conductivity

Media: Rain water, tap water, fresh water, waste water, cooling water, heating water

Oil and water alarm ÖWU

Alarm instrument in wall mounting housing for electrically conducting (e.g. water) and non-conducting liquids (e.g. oil). In connection with the combination probe with photo-electric and conductivity sensors supplied with the unit, the instrument is designed for the detection of liquids. An integrated microprocessor determines whether the detected medium is oil or water. Integrated visual and audible alarms with mute button as well as two output relays (one can be re-set).

Technical specifications

Control unit: Similar to WWG1

Wall mounting rail probe:

W x H x D: 40 x 300 x 55 mm

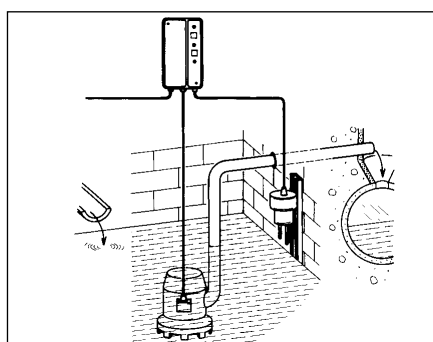
Standard probe cables: 1.5 m

Principle of operation:

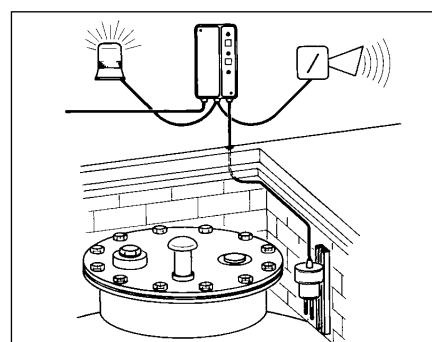
Infrared transmitter/receiver and conductivity measurement

Media: Water, fuel oil EL, diesel, lubricants, motor oil, gearbox oil, hydraulic oil, vegetable oil and transformer oil.

Refer to page 90 for additional application examples.



DG: G; PU: 1	Part no.	Price €
Water alarm WWG1	40029	
Water alarm WWG2	40031	
Oil and Water alarm ÖWU	40028	



Leak detection instruments, conductivity based



Water alarm unit CoFox® ELT 8

The unit is used with a special floor probe for the detection of minute amounts of electrically conducting liquids such as water. The sensitivity is adjustable. The response level of the floor probe is approx. 2-3 mm. Water resulting from clogged drains, rain water, broken pipes, waste water pump failure, etc. causes the relay in the ELT 8 to respond and to operate external alarms via the voltage-free changeover contact. Several probes can be connected in parallel. *

Technical specifications

Supply voltage: AC 230 V

Power consumption: 4 VA

Adjustment range: 2.5-50 kOhm

Relay contacts:

2 x voltage-free changeover contacts

Contact rating:

AC 250 V, 2 A

Operating temperature range:

Ambient: -10 °C/+60 °C

Housing: Wall mounting housing

Protection: IP 30 (EN 60529)

Dimensions (W x H x D):

53 x 113 x 108 mm



Alarm unit CoFox® ELT 500/4

Alarm unit for the detection of electrically conducting liquids such as waste water, acids, etc. (response threshold 50 kOhm). Principle of operation and application areas are similar to those of ELT 8, but this unit features four channels for separate probe circuits. Central alarm via voltage-free changeover contact is possible. Localisation of the leak by means of LEDs with fields that can be labelled on the instrument. Re-set function for alarm. This allows the detection of short term errors. It is recommended to connect the alarm reset unit AQ 220 to the central alarm. ELT 500/4 can be cascaded for large area monitoring. Please order the probes separately. *

Technical specifications

Supply voltage: AC 230 V

Power consumption: 3 VA

Switching threshold: 50 kOhm

Relay contact: 1 x voltage-free changeover contact

Operating temperature range:

Ambient: -10 °C/+50 °C

Protection: IP 30 (EN 60529)



Alarm re-set unit AQ 220

This alarm re-set unit is designed for connection to leak detection systems and level switches (e.g. RG 210, ELT 8, etc.). Visual and audible alarms indicate errors. The audible signal can be muted with the re-set button. The visual signal remains on until the problem is remedied or the probe is no longer in contact with the medium (e.g. in case of leak alarm) or the probe is submerged again (e.g. in case of dry-run protection). As soon as the visual alarm is switched off, the system resumes „ready“ mode. In addition, external alarms can be connected. (If external alarm units are not connected via the AQ 220, there is a risk that they will unintentionally remain switched off.)

Technical specifications

Supply voltage: AC 230 V

Relay contacts:

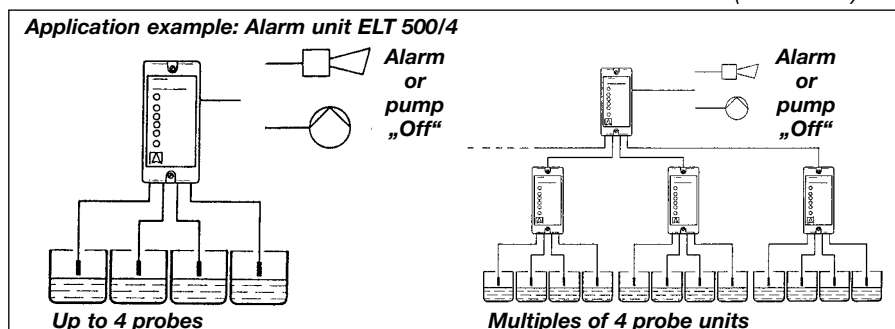
2 voltage-free, normally open contacts (horn, lamp)

Operating temperature range:

Ambient: -5 °C/+50 °C

Protection: IP 30 (EN 60529)

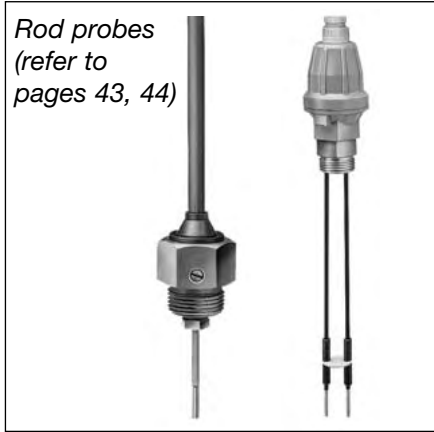
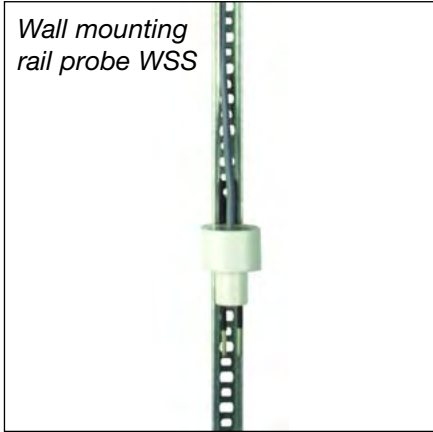
Refer to page 90 for application examples.



DG: E; PU: 1	Part no.	Price €
Water alarm unit CoFox® ELT 8	53503	
Alarm unit CoFox® ELT 500/4	53505	
Alarm reset unit AQ 220	53230	

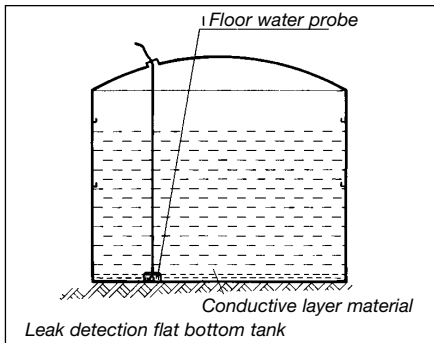
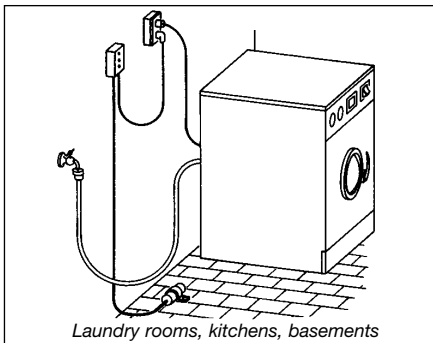
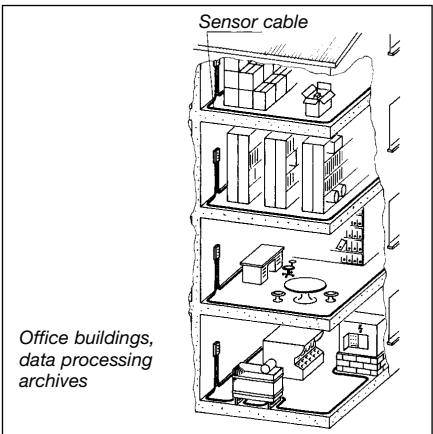
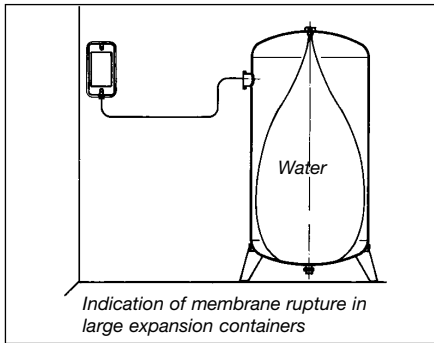
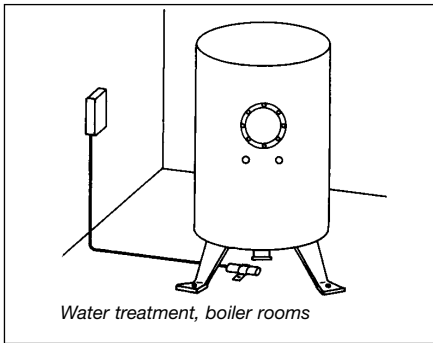
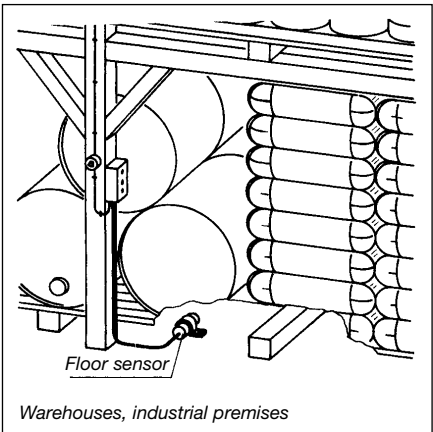
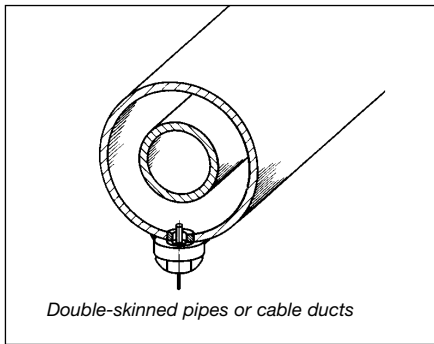
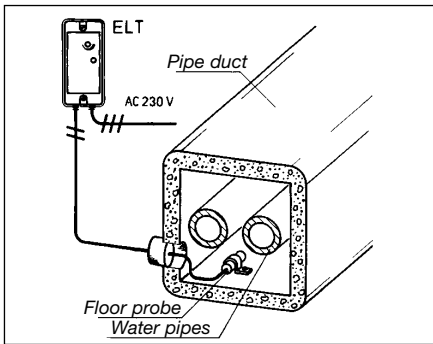
* Standard probes and special probes are available, please refer to page 90 and pages 43, 44. The selection depends on the operating conditions.

Probes for conductivity based leak detection instruments, application examples



Floor water probe BWS 11
 Suitable for ELT 8, ELT 680 and ELT 500/4. Probe diameter 75 mm, cable length 150 cm, response level approx. 2-3 mm.

Wall mounting rail probe WSS
 Height adjustable probe with wall mounting rail. Cable length 150 cm. Adjustment range approx. 200 mm.



Many other probe versions are available. Please enquire.

DG: E; PU: 1	Part no.	Price €
Floor water probe BWS 11	55111	
Wall mounting rail probe WSS	55050	

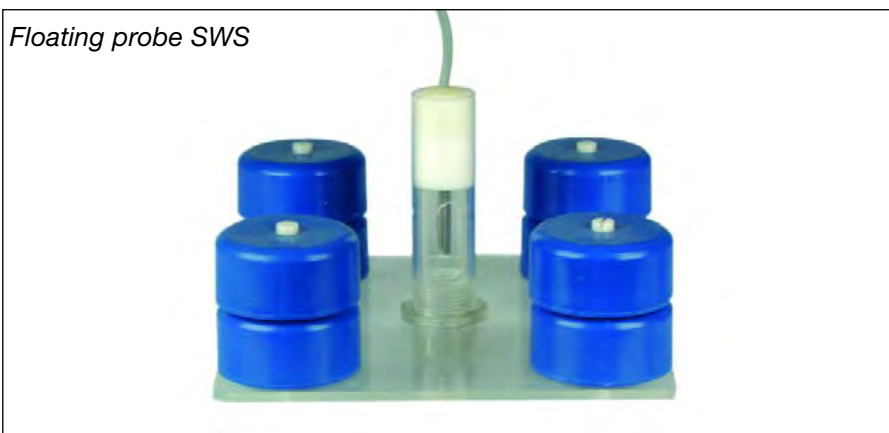
Oil-on-water detector, conductivity based



Oil-on-water detector ÖAWD-8

ÖAWD uses the conductivity principle to detect oil layers on water. Please order the required float probe separately. The float probe submerges the electrodes in the water. The probe circuit is closed. An oil layer on the water (min. thickness 2 mm) breaks the circuit. The alarm is memorised and signalled. The integrated voltage-free contact allows for the connection of additional alarm units such as AQ 220 or actuators (pumps, valves). The indicator is designed for wall mounting in dry rooms. It features „operation“ and „alarm“ lamps as well as a test button and a re-set button. Mounting frames for panel mounting are available. For applications with turbulent surfaces, this version features a delay of approx. 8 seconds which prevents false alarms.

Floating probe SWS



Technical specifications

Supply voltage: AC 230 V

Power consumption: 10 VA

Output:

Voltage-free changeover contact

Contact rating: AC 230 V, 2 A

Housing: Wall mounting housing made from impact resistant plastic (ABS)

Dimensions (W x H x D):

97 x 163 x 62 mm

Protection: IP 42 (EN 60529)

Delay:

8 seconds, alternative: 1 second

Max. probe cable length: 50 m

Oil-on-water detector ÖAWD-1

Oil-on-water detector similar to part no. 55105, but with a response delay of 1 second. Please order the floating probe separately.

Floating probe SWS

Floating probe with height adjustable twin rod electrode for connection to ÖAWD-8, ELT 8 or ELT 680 (for emulsions and foam).

With potted cable connection and 10 m oil resistant 2-core cable.

For the detection of oil on water regardless of changing levels.

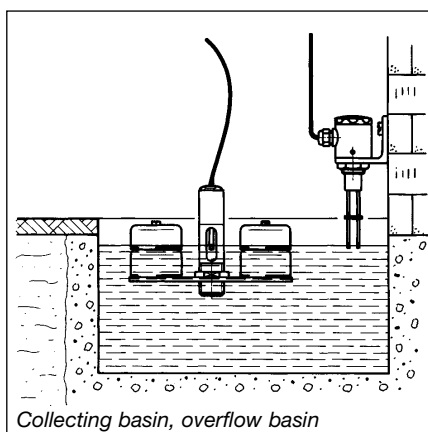
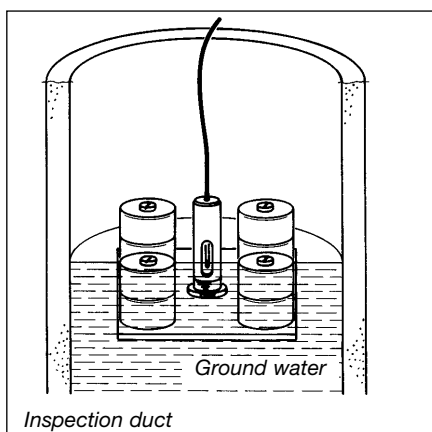
Dimensions (W x H x D):

200 x 140 x 200 mm

Adjustment range:

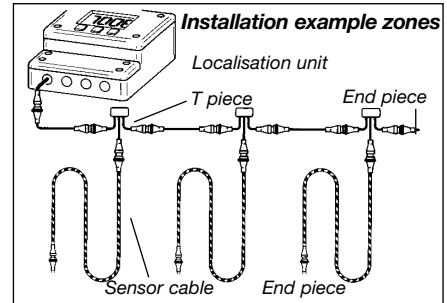
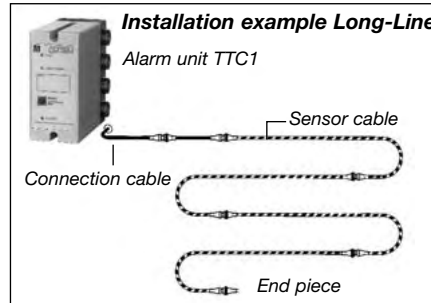
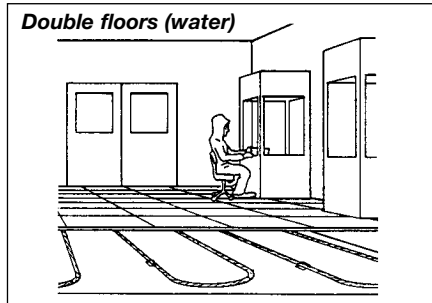
2 to 10 mm oil level thickness

Please refer to page 69 for Ex version.



DG: E; PU: 1	Part no.	Price €
Oil-on-Water detector ÖAWD-8	55105	
Oil-on-Water detector ÖAWD-1	55104	
Floating probe SWS	55100	

Trace Tek® leak alarm system with sensor cable for conducting liquids (water/acids/lyes)



Alarm unit TTC-1

For monitoring smaller areas and installations where the area is easy to oversee. The alarm unit continuously monitors the sensor line for leaks and cable defects. Up to 60 m of sensor cable can be connected to one unit. The unit itself provides visual indication of alarm or cable defects via LEDs. Two integrated relays allow for separate transmission of the alarm or cable break signal.

Technical specifications

Supply voltage:

AC 12-24 V/DC 15-24 V

Alarm relays: 2 for leak, 1 for fault detection

Localisation unit TTDM-128

Suitable for monitoring larger areas or for the precise localisation of leaks, for example if the cables cannot be seen. The localisation unit continuously monitors up to 500 m of sensor line for leaks and cable defects. When the corresponding liquid is detected at a sensor cable section, the TTDM module triggers an audible alarm, closes relay contacts and an LED lights up. In addition, a display indicates the distance to the leak (in feet or metres).

All status and event information can also be transmitted to a building management system via an RS-232/RS-485 interface.

Technical specifications

Supply voltage:

AC 230 V/DC-AC 24 V (optional)

Operating temperature range:

0 °C/50 °C

Interfaces: External serial interfaces RS-232/RS-485

Relays: 3 (maintenance, leak, fault) (2-pole changeover)

Protection: IP 54

Power consumption: < 6 VA (5W)

Please enquire for application examples and additional specifications.

	Part no.	DG	Price €
Alarm unit TTC-1	43810	E	
Localisation unit TTDM-128	43811	E	
Sensor cable TT1000 complete with plug, for water detection			
TT-1000-1M-PC (cable length 1 m)	43706	E	
TT-1000-3M-PC (cable length 3 m)	43707	E	
TT-1000-7.5M-PC (cable length 7.5 m)	43708	E	
TT-1000-15M-PC (cable length 15 m)	43705	E	
Sensor cable TT3000 complete with plug, for detection of chemicals (acids and lyes)			
TT-3000-0.3M-MC (cable length 0.3 m)	43712	E	
TT-3000-1.5M-MC (cable length 1.5 m)	43713	E	
TT-3000-7.5M-MC (cable length 7.5 m)	43714	E	
TT-3000-15M-MC (cable length 15 m)	43715	E	
System accessories and small parts			
TT-MLC-PC (connection cable 3.5 m for water)	43765	E	
TT-MLC-MC (connection cable 3.5 m for chemicals)	43760	E	
TT-MET-PC (sensor end piece for water)	43770	E	
TT-MET-MC (sensor end piece for chemicals)	43775	E	
TTE-PSA (transformer 230 V/24 V)	43740	E	
TTE-XAL (additional alarm, external, audible)	43745	E	
TTC-DRC (adapter for 35 mm rail)	43725	E	
TT-MBC-PC (T piece for water cable)	43711	E	
TT-MBC-MC (T piece for chemicals cable)	43716	E	
TT-HDC-1/4-200 (fixing clips, 200 pieces)	43730	E	
TT-MJC-15-PC (connection cable 15 m)*	43709	E	

*(enables connection of sensor cables in non-adjacent areas or the connection of a remote control unit; connection cable fitted with plug; please enquire for other lengths: 1 m; 3 m; 7.5 m; 30 m))

Chapter 5

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Gas and smoke alarms

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Electronic gas and smoke detectors (GRM)	95-96
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Gas alarm systems in standard DIN-rail housing (GW-SK)	99
Gas sensors (series 400 – 800)	100

05



Gas alarms for domestic use



Gas alarm GS 1.1 Methane

GS 1.1 is a gas alarm for applications in domestic dwellings, with integrated sensor and alarm buzzer. GS 1.1 is a highly sensitive reliable alarm unit. LEDs for operation (green), alarm (red), fault (yellow), the test button and the re-set button are located at the front of the housing. The alarm is triggered when approx. 20 % of LEL is reached. The audible alarm can be muted with the re-set button. The visible alarm remains active until the alarm condition no longer exists (re-set). Factory pre-set for methane (natural gas), the unit is also suitable for other gases such as propane or butane.

Technical specifications

Supply voltage: AC 230 V

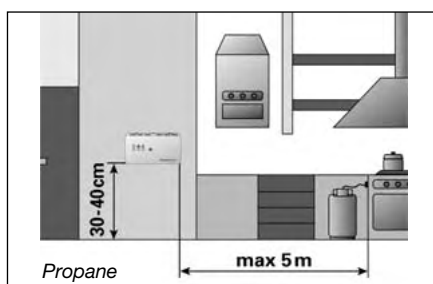
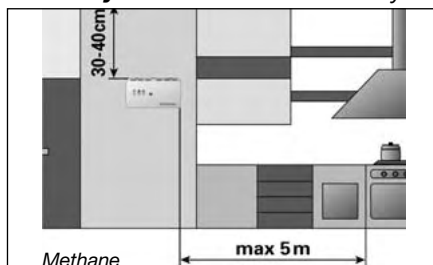
Dimensions (W x H x D):

158 x 90 x 44 mm

Protection: IP 20 (EN 60529)

Temperature range: 0 °C/+50 °C

Humidity: max. 75 % rel. humidity



Gas alarm GS 2.1 Methane

Gas alarm GS 2.1 for applications in domestic dwellings with integrated sensor, alarm buzzer and relay output for connection of external alarm units such as a horn or an alarm lamp. Function and operation are as for GS 1.1.

The unit features an additional input for connection of an external gas sensor type GS 4.1 as a second measuring point. This enables the monitoring of two different rooms. The operating state or alarm condition are visually indicated at both measuring points. The audible alarm is only triggered at the central GS 2.1 unit. This alarm can be muted with the re-set button. The visual alarm remains „on“ as long as the alarm condition exists.

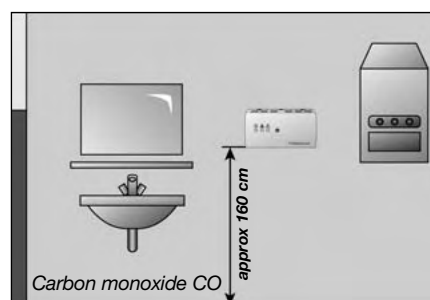
The **GS 4.1 gas sensor** is a remote sensor for the GS 2 gas alarm. The housing contains the semiconductor sensor and the electronics.



The arrangement of the LEDs corresponds to that of the GS 1.1 and GS 2.1 units. The alarm condition is memorised in the GS 2.1. The service life of the semiconductor sensors of the GS 1.1/GS 2.1/GS 4.1 units is approx. 5 years, depending on the operating conditions.

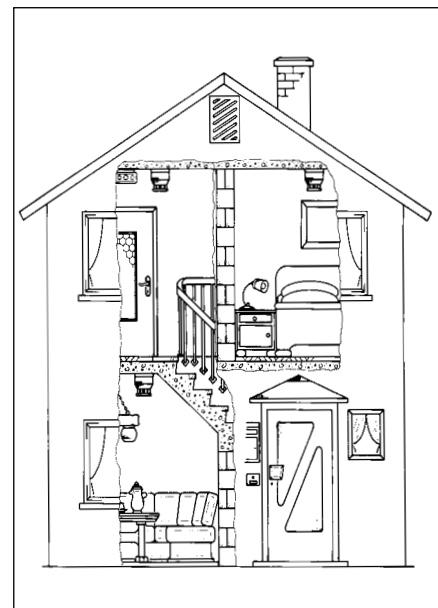
Gas alarm GS 3.1 CO

Gas alarm GS 3.1 for the detection of dangerous CO concentrations. The unit is equipped with a semiconductor sensor (alarm threshold 300 ppm CO, service life approx. 5 years). The unit is only suitable for domestic use. It is installed close to the heating or hot water boiler. Housing, version and function are identical to GS 1.1 (cross sensitive to lacquers, solvents, alcohols, etc.).



DG: M; PU: 1	Part no.	Price €
Gas alarm GS 1.1 Methane	61184	
GS 1.1 Propane/Butane	61186	
Gas alarm GS 2.1 Methane	61185	
GS 2.1 Propane/Butane	61187	
Gas sensor GS 4.1 Methane	61188	
GS 4.1 Propane/Butane	61189	
Gas alarm GS 3.1 CO	61190	

Electronic gas and smoke detector



Electronic gas and smoke detector GRM

When used with gas and smoke sensors (refer to page 96), GRM continuously monitors explosive gases, vapours and/or smoke and generates alarms.

The GRM electronic gas and smoke detector is installed in boiler rooms and basements, storage, office and living rooms as well as public facilities or industrial buildings for increased safety (building technology). The evaluation unit is designed for either wall mounting or control panel mounting by means of a mounting frame (refer to page 74). GRM has an alarm threshold and is fitted with a relay contact. When the threshold value is exceeded, the unit generates an alarm signal. The red „Alarm“ LED lights up and the alarm relay switches. An additional integrated buzzer provides an audible alarm. This audible alarm can be muted with the re-set button. If the condition which caused an alarm is cleared, the visual alarm can then also be re-set by once again pressing the re-set button. Only then can the alarm be muted with the re-set button. However, if the gas concentration level is still above the alarm threshold level, muting of the

alarm is not possible.

Using the voltage-free changeover contact additional alarms or units such as horns, lamps, ventilator fans etc. can be operated and controlled. The following **sensor combinations** are possible:

1. 1 gas and 1 smoke sensor
2. 2 gas sensors
3. 2 smoke sensors
4. 1 gas sensor
5. 1 smoke sensor

Sensor types:

- Gas sensor Part no. 61188 A (for methane)
- Gas sensor Part no. 61189 A (for propane/butane)
- Smoke sensor Part no. 61151

Please order sensors and calibration separately (refer to page 96).

DG: H; PU: 1	Part no.	Price €
Electronic gas and smoke detector GRM	61150	

Technical specifications

Supply voltage: AC 230 V

Power consumption: 15 VA

Inputs: 2 sensors, Connection cable, 3 cores, cross section > 0.5 mm², max. distance evaluation unit - sensor: 150 m

Alarm threshold:

1 permanently fixed alarm threshold for alarm generation at 20 % LEL (for gases) with alarm memory

Alarm:

Red LED and integrated buzzer (approx. 50 dB)

Indicators/outputs:

- 1 green LED – operational
- 1 red LED – blinking for fault - permanently on for alarm
- 1 relay with voltage-free changeover contact

Contact rating: AC 230 V, 2 A

Operating temperature range: 0 °C/+40 °C

Weight: 0.55 kg

Design:

Suitable for wall mounting (control cabinet mounting possible with additional frame)

Housing: Wall mounting housing made from impact resistant plastic (ABS)

(W x H x D): 97 x 163 x 62 mm

Protection: IP 30 (EN 60529)

Gas and smoke sensors for GRM electronic gas and smoke detectors



Gas sensor

Semiconductor gas sensor in plastic housing for connection to electronic gas and smoke detector GRM (refer to page 95). To be used in dry rooms (e.g. heating installations). Detectable gases: methane, butane, propane. LEDs indicate the operating and alarm state of the system also at the sensor:

- LED green – operational
- LED yellow – fault
- LED red – gas alarm

The sensors must be calibrated for the relevant gas. Please specify the gas to be monitored when ordering.

Technical specifications

Measured gases

Inflammable gases and vapours in ambient air

Measuring range

0 to 50 % LEL

Measuring principle

Semiconductor (service life approx. 5 years, depending on operating conditions)

Operating temperature range

0 °C/+40 °C

Humidity

Max. 75 % relative humidity

Housing

Wall mounting plastic housing

Dimensions (W x H x D):

80 x 80 x 35 mm

Weight: approx. 100 g



Smoke sensor

Photoelectronic smoke sensor in plastic housing for connection to electronic gas and smoke detector GRM (refer to page 95). To be used primarily in domestic dwellings (such as living rooms, bedrooms, halls, staircases, corridors). The operating and alarm state is indicated both at the alarm device (GRM) and at the smoke sensor:

- Visual indication via LED green/red at GRM and LED red/red at the smoke sensor.
- Audible alarm via internal piezoelectric buzzer in alarm unit GRM and at the smoke sensor.

Calibration costs for gas sensor

Prior to shipment, the gas sensors listed above are calibrated to the gas specified by the customer. Therefore, please always indicate the gas type when ordering.

Please order sensors and calibration separately.

Technical specifications

Sensor

Photoelectronic

Measuring principle

Scattered light principle

Supply voltage

DC 12-28 V

Audible alarm

85 dBA (at a distance of 3 m)

Test button

For sensitivity, audible alarm

Operating temperature range

+5 °C/+39 °C

Humidity

Max. 80 % relative humidity

Housing

Wall mounting plastic housing

Outside dimensions

Ø 155 mm, height 38 mm

Electrical connections

Screw terminal strip

Weight

approx. 195 g

	Part no.	PU	DG	Price €
Gas sensor for methane	61188A	1	H	
Gas sensor for propane, butane	61189A	1	H	
Calibration costs for gas sensor	61177	1	---	
Smoke sensor	61151	1	H	

Gas alarms systems series GW-S for industrial and domestic applications



GW-S

Compact, freely programmable gas alarm system with wall mounted housing for the connection of 1 or 2 sensors. The evaluation unit can monitor various types of gases. GW-S can be operated in single or dual stage mode. Four integrated relays can be assigned as required (one relay is used for general alarm and one relay for the audible alarm signal (horn). The other relays are available for control outputs. The gas alarm station features a display with alternating indication of different measurement points and three operating levels:

1. Measurement level: the unit displays the measured values, faults and alarms.
2. Parameter level: this level displays measuring ranges, limit values and alarm groups.
3. Service level: this level allows you to show the limit values, perform function checks of the relays and edit the parameters (such as alarm group and limit value settings, etc.).

Operation

When the GW-S unit is switched on, the „ready“ LED lights up. The system alternately displays the concentrations present at each measuring point. The LED of the relevant sensor lights up. When the alarm levels 1 or 2 are exceeded, the relevant alarm LED lights up. At the same time, the corresponding alarm relay is activated. When the concentration falls below

alarm level 1, the alarm is cleared.

This also applies to alarm 2, provided the system runs in „non-memorising“ mode. Otherwise, alarm 2 remains active and can be cleared by means of the Reset button. The relay for the horn can also be programmed for each alarm level. It can be muted immediately by means of the Reset button or it is automatically deactivated after 2 minutes. Each time a new alarm is triggered, the horn is activated. In addition, an LED indicates the alarm status. In „stop“ mode, the system permanently indicates the concentrations measured at a specific measuring point. The system is self checking and monitors cable defects, short circuit and power failure. Such faults are indicated by an LED and a relay. In addition, the display shows an „E“. Using a special code all system data can be modified or re-confirmed.

Special features

- 2 sensors can be connected
- Limit values can be adjusted as required for each channel
- Simple to service
- 1 horn output
- 1 fault output
- Serial interface (option)
- Displays concentrations present at each measuring point in sequence or permanently displays the concentration at one specific point
- Alarm test without test gas
- Highly versatile and easy to use

- due to microprocessor technology
- Freely adjustable alarm levels (1-2)
- Computer-aided setup
- Alarm memory facility (1-2)
- Self-monitoring: power failure (option), cable break, sensor short circuit, computer defect
- Re-set for horn and alarm
- LEDs for alarm and sensor faults
- Digital display of concentration, programming data or calibration data
- Relay outputs for alarms freely selectable (max. 2), 1 each for horn and general alarm

Technical specifications

Supply voltage: AC 230 V

Inputs:

Up to two sensors can be connected, all sensor types with 4-20 mA output

Alarm thresholds:

Max. 2, adjustable, „memorise“ or „non-memorise“ mode

Outputs:

4 voltage-free relay contacts, serial interface (option)

Controls:

Keypad for alarm and horn reset, edit, menu selection, Enter

Display elements:

LEDs for:

- Alarm and error for each measuring point
- „Operational“, horn and indicated measuring point
- Digital display for:
- Concentration values, menus ...

Operating temperature range:

-10 °C/+40 °C

Power consumption:

Max. 20 VA

Protection: IP 54 (EN 60529)

Housing: Wall mounting housing

Dimensions (W x H x D):

195 x 160 x 137 mm

Weight: 1,300 g

Sensor types:

Series 400, 500, 600, 700 and 800 (refer to page 100)

GW-S4

Similar to GW-S, but for connection of up to 4 sensors

DG: H; PU: 1	Part no.	Price €
GW-S	61146	
GW-S4	61145	

Gas alarm systems for 19" rack mounting/test gas unit



GW-SE

Similar to GW-S but designed for 19" rack mounting. Each 19" rack unit (3HE) accepts 7 plug-in modules (=total of 14 measuring points). 2 sensors can be connected to each plug-in module. Each plug-in module is equipped with its own power supply. Available accessories comprise a back-up 24 V emergency power supply module as well as a module fitted with a key switch for servicing purposes.

Upon request, we design and build the complete gas alarm system for you and service it at regular intervals.

Refer to page 100 for sensors.

Test gas unit

For checking gas alarm systems during maintenance and repair work.

Scope of delivery

The unit consists of a plastic case with inlay, test gas cap and withdrawal unit (valve with flow meter and test gas tube). Can accommodate up to 2 test gas cylinders. Test gas is not included. Please order test gas cylinders separately.

	Part no.	PU	DG:	Price €
GW-SE 19" plug-in module	61147	1	H	
Accessories:				
19" module, 24 V emergency power supply	69107	1	H	
19" module with key switch	69108	1	H	
19" rack unit 3 HE	61172	1	H	
Wall mounting housing for 1 rack unit 3 HE	61173	1	H	
Wall mounting housing for 2 rack unit 3 HE	61174	1	H	
Wiring per 19" board	61176	1	---	
Calibration costs calibration/programming costs for alarm threshold for standard gases (methane, propane/butane, hydrogen) per sensor	61177	1	---	
Calibration costs calibration/programming costs for alarm thresholds per sensor	61183	1	---	
Test gas unit	61100	1	E	
MiniFlo valve with flow meter Brass valve and Perspex flow meter with stainless steel float for gas flow regulation from 0.5 to 1.5 l/min	69050	1	E	
Test gas methane 20 % LEL , non-recyclable cylinder containing 12 l	69060	1	E	
Test gas methane 40 % LEL , non-recyclable cylinder containing 12 l	69061	1	E	
Test gas propane 20 % LEL , non-recyclable cylinder containing 12 l	69062	1	E	
Test gas propane 40 % LEL , non-recyclable cylinder containing 12 l	69063	1	E	
Test gas carbon monoxide (300 ppm) , non-recyclable cylinder containing 12 l	69064	1	E	
Synthetic air for zero point calibration , non-recyclable cylinder containing 12 l	69065	1	E	
Please enquire for other test gases.				

Gas alarm system GW-SK in standard DIN-rail housing



GW-SK

Compact, freely programmable gas alarm system with standard DIN-rail housing for the connection of up to 6 sensors with alternating indication of measured values. The evaluation unit can monitor various types of gases. Six integrated relays can be assigned as required (one relay is used for general alarm and one relay for the audible alarm signal (horn). The other relays are available for control outputs.

The following combinations are possible:

- 1 alarm threshold, 6 sensors, 4 alarm groups
- 2 alarm thresholds, 6 sensors, 2 alarm groups
- 3 alarm thresholds, 6 sensors, 1 alarm group

The gas alarm station features a display with alternating indication of measured values and three operating levels:

1. Measurement level: the unit displays the measured values, faults and alarms.
2. Parameter level: this level displays measuring ranges, limit values and alarm groups.
3. Service level: this level allows you to show the limit values, perform function checks of the relays and edit the parameters (such as alarm group and limit value settings, etc.).

Operation:

When the GW-SK unit is switched on, the „operational“ LED lights up. The system then alternately displays the concentrations present at each measuring point. The LED of the

relevant sensor lights up.

When the alarm levels 1 or 2 are exceeded, the appropriate alarm LED lights up. At the same time, the corresponding alarm relay is activated. When the concentration falls below alarm level 1, the alarm is cleared. This also applies to alarm 2, provided the system runs in „non-memorising“ mode. Otherwise, alarm 2 remains active and can be cleared with the re-set button. The relay for the horn can also be programmed for each alarm level. It can be muted immediately with the re-set button or it is automatically deactivated after 2 minutes. Each time a new alarm is triggered, the horn is activated. In addition, an LED indicates the alarm status. In „stop“ mode, the system permanently indicates the concentrations measured at a specific measuring point.

The system is self-checking and monitors cable defects, short circuit and power failure. Such faults are indicated by an LED and the fault relay. In addition, the display shows an „E“. Using a special code all system data can be modified or re-confirmed.

Special features:

- Limit values can be adjusted as required for each channel (max. 1-4)
- 1 horn output
- 1 fault output
- Serial interface (option)
- Displays the concentrations present at each measuring point in sequence or permanently displays the concentration at one specific point
- Alarm test without test gas
- Highly versatile and easy to use due to microprocessor technology
- Flexible operation
- Simple to service
- Designed for up to 6 sensors
- Freely adjustable alarm levels (max. 1-4)
- Computer aided set-up
- Alarm memory facility (max. 1-4)
- Self-checking: power failure (option), cable break, sensor short circuit, computer defect
- Reset for horn and alarm

- LEDs for alarm and „fault“ for sensors 1-6
- Digital display with choice of: concentration, programming data or calibration data
- Relay outputs for alarms freely selectable (max. 4), 1 each for horn and general alarm

Technical specifications

Supply voltage:

DC 24 V or AC 18 V

Inputs:

Up to six sensors can be connected, all sensor types with 4-20 mA output

Alarm thresholds:

Max. 4, adjustable, „memorise“ or „non-memorise“ mode

Outputs:

6 voltage-free relay contacts, serial interface (option)

Controls:

Keypad for alarm and horn reset, edit, menu selection, Enter

Display elements:

LEDs for:

- Alarm and fault for each measuring point
- „Operational“, horn and indicated measuring point
- Digital display for:
- Concentration values, menus ...

Operating temperature range:

-10 °C/+40 °C

Power consumption:

max. 30 W at 24 V

Protection:

IP 30 (EN 60529)

Housing:

according to DIN 43880, for 35 mm

DIN rails

Dimensions (W x H x D):

195 x 160 x 137 mm

Electrical connections:

35-way screw terminals

Weight:

650 g

Sensor types:

Series 400-, 500-, 600-, 700- and 800 (refer to page 100)

DG: H, PU 1	Part no.	Price €
GW-SK	61163	
Options:		
Connection kit for AC 230 V operation	69114	
Connection kit for emergency power supply	69115	

Gas sensors series 400, 500, 600, 700, 800



New development for monitoring air quality



Gas sensor 700 ST-CO₂ LG

Gas sensors series 400, 500, 600, 700 and 800

Series 400 (semiconductor), 500 (heat tone), 600 (electrochemical), 700 (infrared) and 800 (zirconium dioxide) for connection to gas alarm systems (evaluation units) types GW-S, GW-SE, GW-S4 and GWSK. The gas sensors are connected to the corresponding units. The sensors are suitable for dusty and dirty environments. Depending on the version (measuring principle), they are used to detect inflammable and explosive or toxic gases. All sensors of this series feature a 4-20 mA output signal. The gases and vapours which can be detected comprise: methane, propane, butane, hydrogen, acetylene, ammonia, acetone, alcohol and fuel vapours, CO, CO₂, O₂, etc. Please enquire for calibration for other gases.

Technical specifications

Measured gases:

- Toxic gases (in ambient air)
- Inflammable gases and vapours
- Oxygen
- Special gases (on request!)

Measuring ranges:

Gas sensor 400ST
0 up to 50 % LEL
Gas sensor 500ST/510 Ex
0 up to 99 % LEL
Gas sensor 600ST-O₂
0 up to 21 % by vol.
Gas sensor 700ST-CO₂
0 up to 5 % by vol.
Gas sensor 700ST-CO₂LG
0 up to 3000 ppm
Gas sensor 800ST-O₂
0.1 to 21 % by vol.

Measuring principle:

Gas sensor 400ST semiconductor
Gas sensor 500ST/510 Ex heat tone
Gas sensor 600ST-O₂ electrochemical
Gas sensor 700ST-CO₂ infrared
Gas sensor 800ST-O₂ zirconium dioxide basis

Supply voltage:

Ambient temperature:

Sensor 400/600/700: -10 °C/+40 °C
Sensor 500: -20 °C/+40 °C
Sensor 800: -10 °C/+50 °C

Permissible relative humidity:

Sensor 400: 40 % to 50 %
Sensors 500/600/700/800: 15 % to 95 %

Atmospheric pressure:

Sensors 500/600/700/800: 900 to 1100hPa
Sensor 510 Ex: 700 to 1300hPa

Protection: IP 40/54 (510 Ex)

Housing/wall mounting: Aluminium

Dimensions: 400/500/600/700/800:

90 x 85 x 65mm (510 Ex) octagonal, H=108 mm, Ø=100 mm

Weight: 400/500/600/700/800 approx. 0.4 kg

510 Ex approx. 1.2 kg

Output: 4-20 mA, RS 232 (option)

Connection cable: 3 x 1.5 mm² Cu + protective conductor; screened cable; signal and return conductor max. 100 Ohm cable resistance.

Approval: Sensor 510 Ex

EC design type approval by Deutsche Montan Technologie GmbH, according to directive 94/9/EG (ATEX100a) with the following certificate:
BVS 03 ATEX E 260 X
Ex II 2G EEx d IIC T6

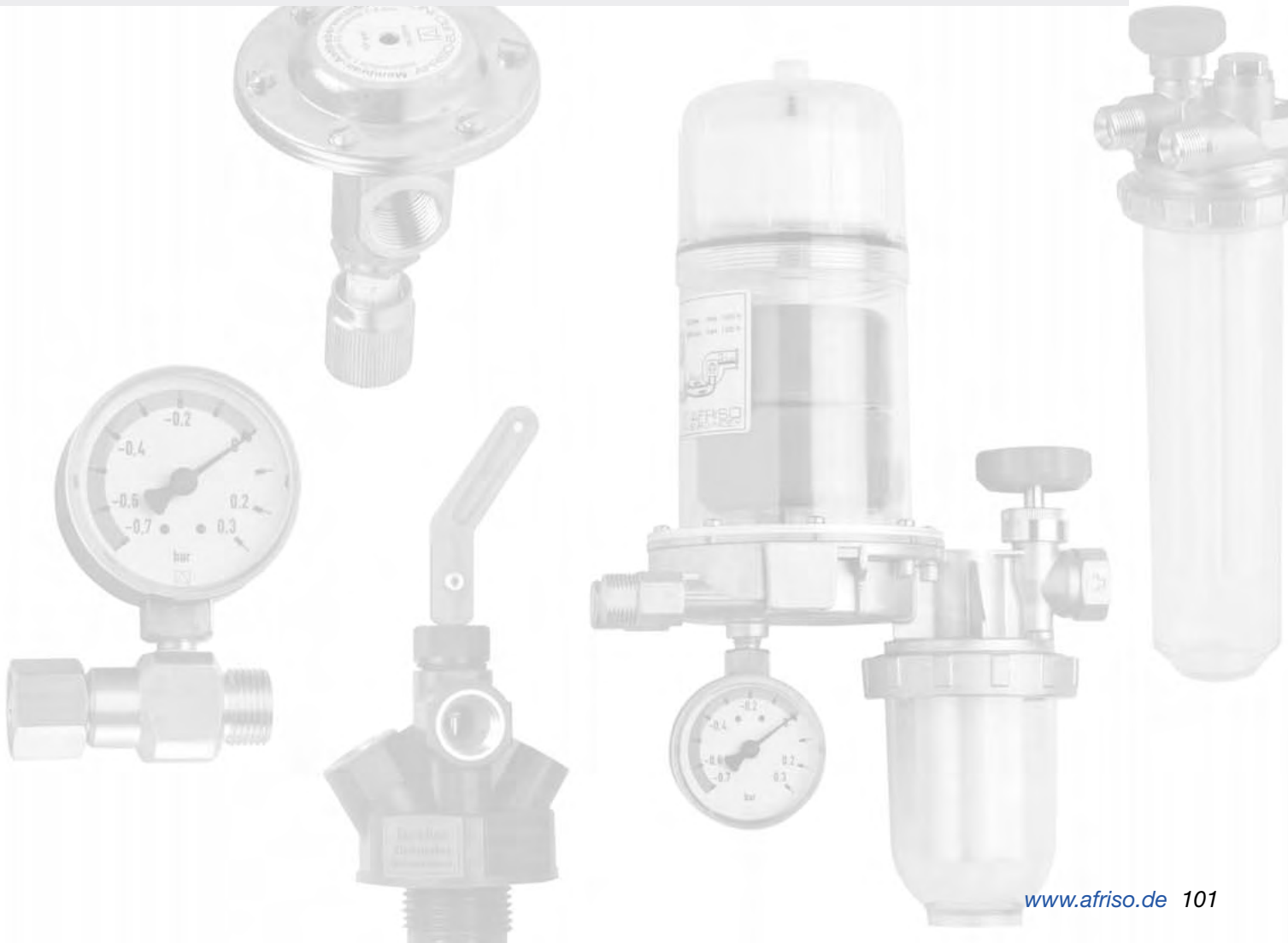
	Part no.	PU	DG:	Price €
Gas sensor 400 ST for detecting explosive gases and vapours, semiconductor	69145	1	H	
Gas sensor 400 ST for special gases, semiconductor	69145S	1	H	on request
Gas sensor 500 ST for detecting explosive gases and vapours, heat tone principle	69109	1	H	
Gas sensor 500 ST for special gases, heat tone principle	69109S	1	H	on request
Gas sensor 510 Ex with digital display for explosive gases and vapours, heat tone principle, Ex version	69111	1	H	
Gas sensor 510 Ex with digital display for special gases, heat tone principle	69111S	1	H	on request
Gas sensor 600 ST-O₂ for detecting oxygen concentrations (0-21 % by volume O ₂), electrochemical	61179	1	H	
Gas sensor 600 ST-CO for detecting carbon monoxide concentrations (0-300 ppm CO), electrochemical	61180	1	H	
Gas sensor 700 ST-CO₂ for detecting carbon dioxide concentrations, infrared (0-5 % by volume)	69112	1	H	
Gas sensor 700 ST-CO₂ LG application area: e.g. monitoring the air quality in low energy houses	69104	1	H	
Gas sensor 800 ST-O₂ for detecting oxygen concentrations (0.1-25 % by volume), zirconium dioxide	69113	1	H	
Calibration calibration/programming costs for the alarm thresholds for standard gases (methane, propane/butane, hydrogen) per sensor	61177	1	---	
Calibration calibration/programming costs for the alarm thresholds for special gases per sensor	61183	1	---	

Chapter 6

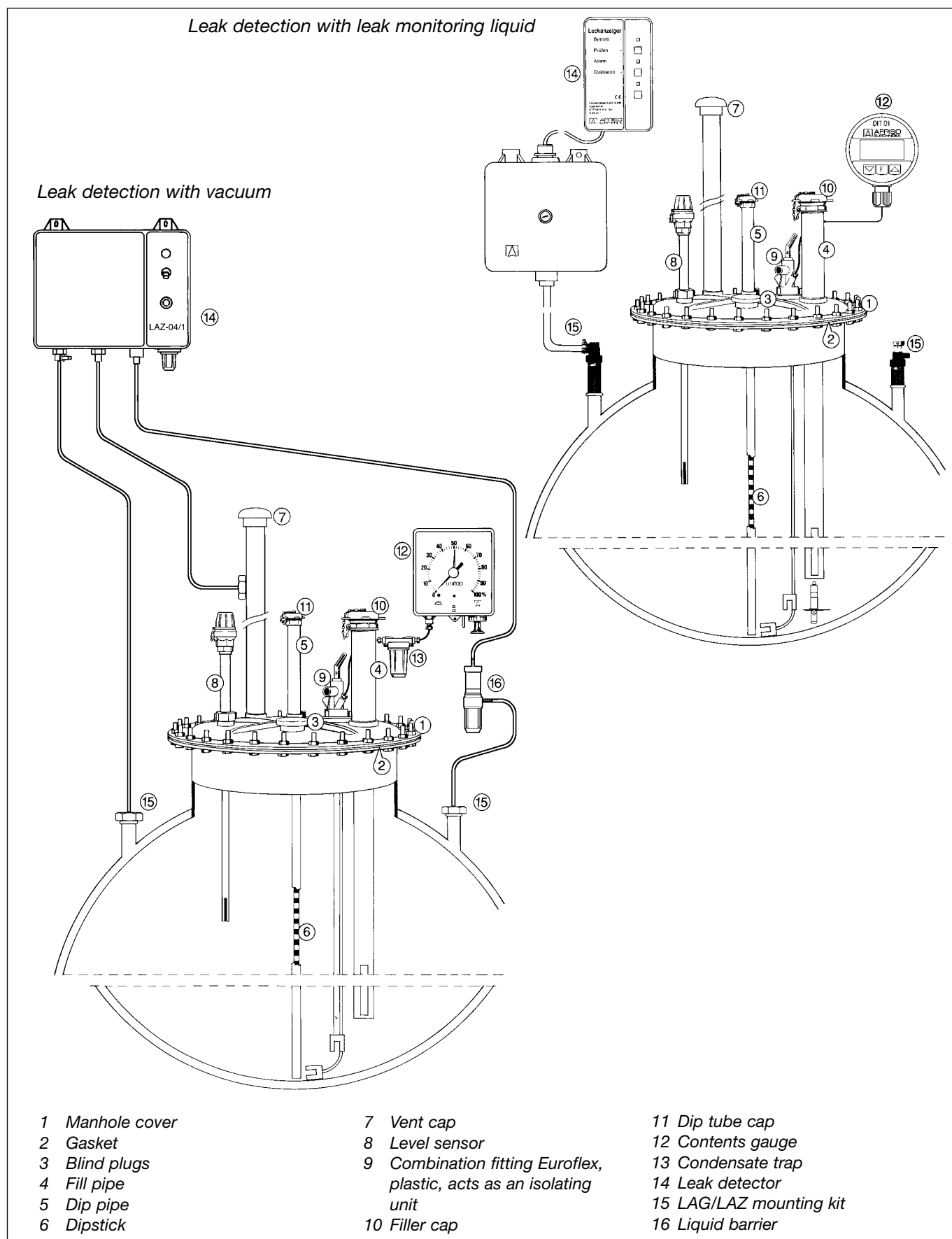
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Accessories for fuel oil tanks and oil carrying pipes and hoses

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06


Equipment for a double-skinned underground tank (overview)



Tank fittings, overpressure devices



GWG filler cap

For fuel oil EL standard, diesel and bio-diesel. Bayonet connection G2 according to DIN EN 14420-6 with integrated level sensor connection fitting. Male coupling made from brass. Filler cap made from oil- and weather resistant plastic. Lockable.

Filler cap

Similar to GWG filler cap, but without the level sensor plug.



GWG filler cap - green

For low sulphur fuel oil EL (green colour code). Bayonet connection G2 according to DIN EN 14420-6 with integrated level sensor connection fitting. Brass male coupling. Filler cap made from oil- and weather-resistant plastic. Lockable. Red plate („Also for fuel oil EL standard“) is included. (Refer to page 55)



Overpressure device

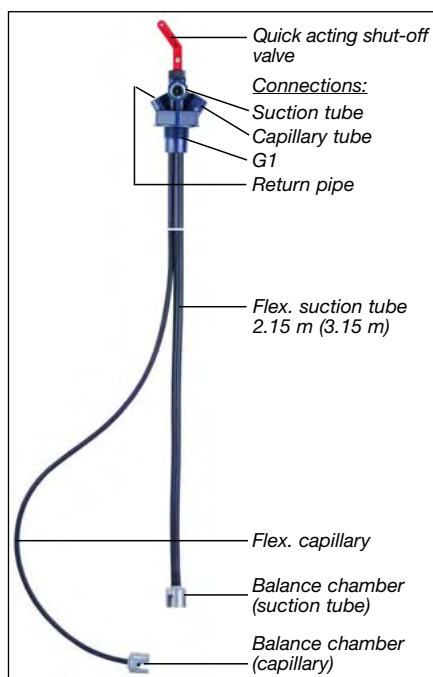
Prevents overpressurisation of storage tanks during filling. G1½ male threaded connection. Opens to release pressure at approx. 25 mbar. Two or more overpressure devices must be installed for filling rates of more than 300 l/min.

DG: G	PU	Part no.	Price €
GWG filler cap	10	20430	
GWG filler cap - green	10	20443	
Filler cap	10	20440	
Overpressure device	25	20466	



DG: G	PU	Part no.	Price €
Dip tube cap G1 x 1¼	25	20464	
Filler cap G2 x 2½ Heavy duty version, fuel oil EL standard	55	20445	
Filler cap – green G2 x 2½ Heavy duty version, fuel oil EL low sulphur	25	20452	
Vent caps			
Vent cap G2 plastic, push-on	25	20460	
Vent cap G1½ plastic, push-on	25	20450	
Vent cap G2 plastic - male thread	25	20462	
Vent cap G2 metal	25	20463	
Vent cap G1½ metal	25	20455	

Tank withdrawal systems



Euroflex 3 (2.15)

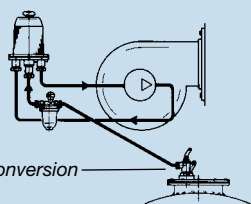
Combination fitting as a withdrawal system for fuel oil, with capillary and TÜV-tested isolating piece. G1 tank connection. Throughput up to 150 l/h. Threaded female connection G $\frac{3}{8}$ (galvanised steel) for suction and return pipes. Universal screw connections for pipes with 8/10/12 mm outside diameter. Capillary connection for hose or pipe with 6 mm outside diameter. Silent non-return valve with elastic valve seat. Quick acting shut-off valve with lever arm for remote activation (refer to page 108 for pull cord). Pressure- and vacuum-tight up to 1 bar. Type approval 01/BAM/3.10/185. TÜV report no.: S S218 2005 Z1

Euroflex



Conditions for inherently secure suction pipes according to TRbF 231 (2/5-3)

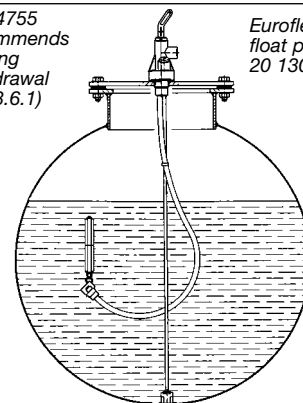
- Suction pipe with constant gradient to tank.
- If a leak occurs, oil flows back into the tank due to a break in the liquid column.
- No non-return valve between Flow-Control and suction point (remove foot valve).



Euroflex with conversion kit

According to TRbF 231 (No. 2/5-3), non-return valves must not be installed in inherently secure suction pipes. The conversion kit replaces the non-return shut-off valve in the Euroflex with a normal shut-off valve. The suction pipes of tanks installed at lower levels are often required to be inherently secure suction pipes. Non-return valves and foot valves must be removed so that the oil can flow back into the tank in case of leaks. The burner cuts out and the leakage is detected. Euroflex can be converted.

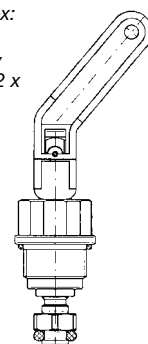
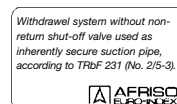
DIN 4755 recommends floating withdrawal (4.3.3.6.1)



Euroflex with float part no. 20 130

Conversion kit for Euroflex:

- shut-off valve for conversion to an inherently secure suction pipe + 2 x adhesive labels.



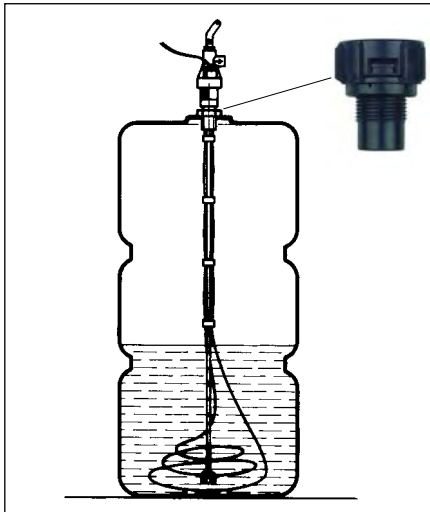
Euroflex 312



Miniflex

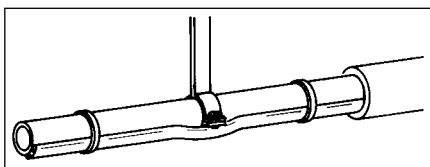
DG: G	PU	Part no.	Price €
Euroflex 3 (2.15) hose 2.15 m	25	20160	
Euroflex 3 (3.15) hose 3.15 m	25	20164	
Euroflex 2 (2.15) without capillary	25	20162	
Conversion kit Float-Set G1 for Euroflex and Miniflex.	10	20125	
Conversion kit Float-Set G1½ for communicating withdrawal systems.	10	20120	
Euroflex 3 with float , similar to Euroflex 3 (2.15), but suction hose end with float. Oil withdrawal always in „clean“ area.	10	20130	
Conversion kit shut-off valve for Euroflex (since 10/98), Miniflex and AFRISO withdrawal systems for battery tanks.	1	74305	
Euroflex 312 (GWG 12K/1C) similar to Euroflex 3, but with integrated level sensor for battery tanks according to DIN 6620 and tanks assembled on site according to DIN 6625. Always useful if a female connector is not available at the tank. Connection G1½.	5	20190	
Miniflex 3 Brass withdrawal system similar to 3, but with brass screw connection (i.e. cannot be used as an isolating piece).	25	74300	
Miniflex 2 Brass similar to Miniflex 3, but without connection for capillary tube.	25	74200	

Euroflex with integrated tank heating, oil pipe heater



Euroflex TH 5 m heater band

Euroflex combination withdrawal system with integrated, temperature controlled heater band (5 m) for tank heating. Designed for tanks which are subjected to temperatures below +5 °C (cloud point!). A heater band is attached to the suction pipe. At the bottom of the tank the band forms a spiral around the suction point. The heat output is 25 W per meter at a temperature of 10 °C. The required length depends on the tank type and size as well as the installation site. The temperature controlled heater band prevents overheating and burning out. The band is connected to AC 230 V via a connection cable (2 m) and an RCB safety switch (according to DIN VDE 0664 part 3, EN 61005). Using a special G1 female x G1 male connection, the fitting can be adapted to the tank without twisting.



Oil pipe heater

Electrical pipe heater made from self-regulating heater band with connection cable (2 m) for pipes carrying heating oil. **Refer to the table for standard lengths.** Connection to AC 230 V by means of an RCB safety switch.

Safety switch TS 5



Outdoor temperature sensor 5

RCB safety switch

In safety housing IP 65 with connection facility for remote sensor (outdoor or pipe temperature sensor).

RCB safety switch TS 5

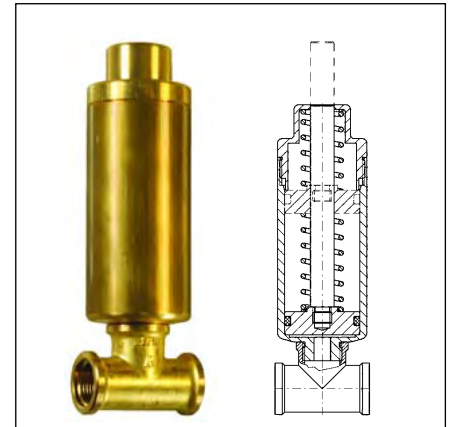
In safety housing IP 65 with integrated temperature switch (+5 °C).

Outdoor temperature sensor 5

With temperature switch (+5 °C) for connection to RCB safety switch part no. 21025.

Pipe temperature sensor 5

With temperature switch (+5 °C) for connection to RCB safety switch part no. 21025.



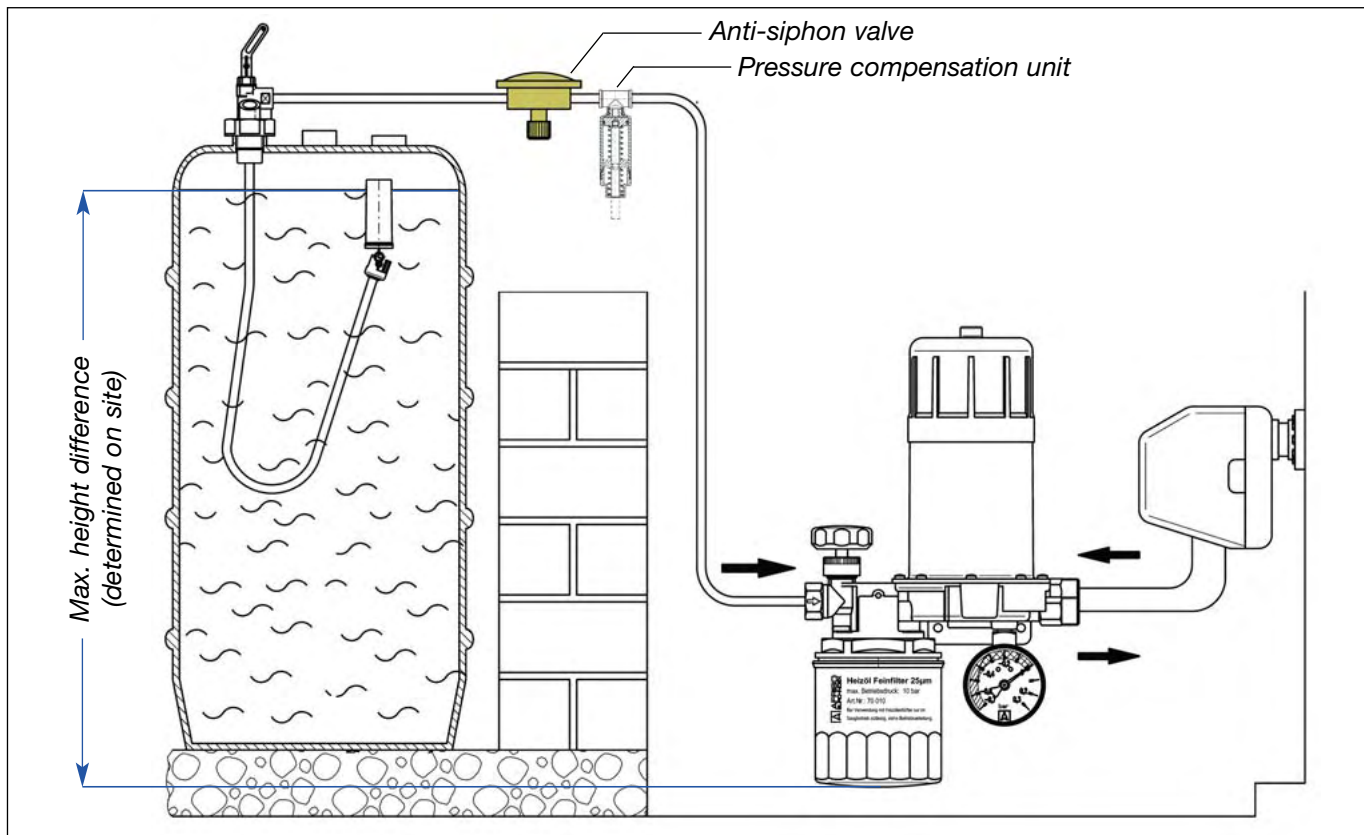
Pressure compensation unit DAE

Used to limit the pressure increases resulting from liquid expansion caused by temperature changes in closed pipe sections. Suitable for heating oil pipe sections which are closed at both ends (e.g. by solenoid or non-return valves) and which are subject to considerable temperature changes (e.g. due to oil pipe heaters). G^{3/8} female connections at both ends. A pipe volume of 725 cm³ can be buffered at a temperature difference of 40 °C. This corresponds to the following max. pipe lengths (depending on the pipe diameter):

Pipe diameter (mm)	Max. pipe length (m)
Ø 8x1	25.5
Ø 10x1	14
Ø 12x1	9

DG: G	Part no.	Price €
Euroflex TH 5 m heater band	21010	
Euroflex TH 7.5 m heater band	21011	
Euroflex TH 10 m heater band	21012	
RCB safety switch	21025	
RCB safety switch TS 5	21026	
Outdoor temperature sensor 5	21027	
Pipe temperature sensor 5	21028	
Pressure compensation unit DAE	20800	
Oil pipe heater 5 m	21015	
Oil pipe heater 7 m	21016	
Oil pipe heater 10 m	21017	
Oil pipe heater 15 m	21018	
Oil pipe heater 25 m	21019	
Oil pipe heater 50 m	21020	

Anti-siphon valves



Depending on national and local legislation or directives, tank installations for heating oil and their associated pipes are subject to certain approvals. The objective is to prevent ground water pollution.

If the maximum oil level in the storage tank is higher than the bottom of the suction pipe (see installation example), oil could be siphoned out from the tank if a leak exists or occurs in the oil line. Therefore, suitable protection devices such as solenoid valves and diaphragm anti-siphon valves must be installed. In Germany and many other countries, both types of valves require approval by the relevant authorities in charge. It must be ensured that the vacuum at the suction side of the burner pump does not exceed 0.4 bar.

Factors to be considered include:

- The maximum suction height at minimum oil level
- The suction pipe length
- The viscosity of the oil in the storage tank at extreme winter temperatures
- Additional pressure losses caused by fittings (such as oil filters, valves, etc.) and pipes

Anti-siphon valves



MAV-Universal

MAV 3 for oil carrying pipes at a height difference of no more than 3 metres between the maximum oil level in the tank and an oil burner installed below that level. MAV-Universal is fully adjustable for heights from 1-3 m. MAV-Universal can therefore be adapted to local site conditions in an optimum way. The vacuum at the suction side of the oil burner pump is not unnecessarily increased. Prevents oil from escaping in case of leaks in the suction pipe. MAV-Universal closes under spring pressure and opens with the vacuum created by the pump suction. Refer to page 108 for screw connections.

Technical Approval of the German Institute for Building Technology: Z-65.50-415



Technical specifications

Flow rate: Max. 120 l/h
Mounting position: Horizontal
Connection thread: G³/₈ female
Material: Brass
Weight: 0.38 kg
Operating range
Vacuum: -0.4 bar
Suction pipe length: Max. 10 m
Height difference: Max. 3 m

Diaphragm anti-siphon valve MAV 1.8

Similar to MAV-Universal, but pre-set to a maximum height difference of 1.8 m.

Diaphragm anti-siphon valve MAV 3

Similar to MAV-Universal, but pre-set to a maximum height difference of 3.0 m.



Solenoid valve Vakumat

Vakumat is installed in the suction pipe between the oil tank and the burner if the burner is located below the upper edge of the tank. The solenoid valve prevents oil from being siphoned out of the tank if there is a leak in the suction pipe. The solenoid valve only opens when the burner is in operation. When the burner is off, the valve is closed. Vakumat safeguards suction pipes without pressure loss at full throughput regardless of any height difference between highest and lowest suction point levels. Vakumat is TÜV-tested. We recommend installing a pressure compensation unit (refer to page 105) between the solenoid valve and the burner to compensate for temperature related pressure increases in the oil line.

Technical specifications

Operation: Closed when de-energised
Pressure: 0 to 1 bar
Medium: Fuel oil
Operating temperature range: -20 °C/+80 °C
Valve housing: Brass
Supply voltage: AC 230 V
Power consumption: 18.5 VA
Protection: IP 65 (EN 60529)
Mounting position: Solenoid upright
Connection: G³/₈ or G¹/₂
Kvs value: 1.4 m³/h

DG: G	PU	Part no.	Price €
MAV-Universal	10	20139	
Diaphragm anti-siphon valve MAV 1.8	10	20184	
Diaphragm anti-siphon valve MAV 3	10	20183	
Solenoid valve Vakumat G ³ / ₈	10	20143	
Solenoid valve Vakumat G ¹ / ₂	10	20144	

Mounting accessories, pull cord, screw connectors

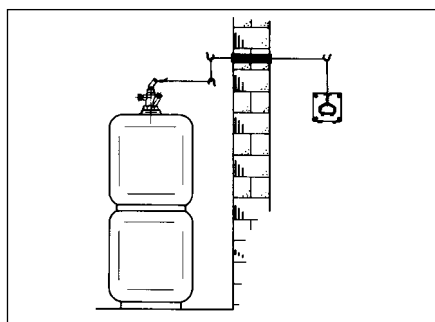


Reducer 2 x 1½

Reducer G2 x G1½ made from grey plastic (ABS).

Reducer 1½ x 1

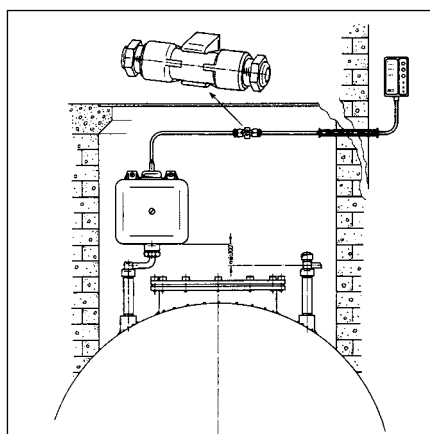
Reducer G1½ x G1 made from grey plastic (ABS).



Pull cord, complete

The pull cord is supplied with a handle and a sealable case for the remote activation of quick-acting valves. TÜV-tested. Consisting of:

- 10 m long pull cord (steel, plastic-coated)
- Handle
- 4 eyelet screws for fastening/deflecting the cord
- Sealable case with wire and lead seal
- Dowels and screws



LAG mounting kit

Mounting kit designed for connecting leak detectors to double-skinned storage tanks with liquid filled interstitial space. The kit consists of a test/vent valve with a hose connection and a G1 threaded pipe nipple for connection to



Pneumofix

Mounting kit Pneumofix for pneumatic tank contents gauges. Please refer to page 15 for details. Euroflex 3 is recommended if the tank has no spare socket for a gauge capillary connections. All Euroflex 3 versions have a gauge capillary connection (refer to page 104).

the storage tank. G¾ hose connection for container for leak monitoring liquid. EPDM hose 20 x 3 mm, 80 cm long (with BAM approval). Hose clips, cable connection fitting for LAG probe, screws and dowels for mounting the LAG container.

DG: G	PU	Part no.	Price €
Reducer 2 x 1½	10	20903	
Reducer 1½ x 1	10	20905	
Bag of accessories for MAV (screw connection, 2 pieces each, with Cu flat gasket)			
G¾ x 6 mm	10	20507	
G¾ x 8 mm	10	20504	
G¾ x 10 mm	10	20505	
G¾ x 12 mm	10	20506	
LAG mounting kit	5	40540	
Pneumofix	10	20153	
Capillary tube 50 m	1	20158	
Hose connector	10	20036	
Condensate trap KG 2 Universal connections for hose or pipe with 6 mm outside diameter.			
	5	20320	
Pull cord, complete	10	20475	

Comparing heating oil filters

Which filter is the best?

new



Opticlean MC-7

Optimum filter surface due to folded paper filter.

Opticlean MC-18

Optimum filter effectiveness and long service life.

Replacement filter cartridge

Excellent filter effectiveness, also suitable for operation under pressure.

Paper filters

Optimum ultra-fine filtering. Specially for very small and small burner capacities. Preferably for single line operation.

Opticlean MC-7 ultra-fine filter

Mesh size: 5-20 μm

Filter surface: 700 cm^2

Opticlean MC-18 ultra-fine filter

Mesh size: 5-20 μm

Filter surface: 1850 cm^2

Can be used with long filter bowl.

Replacement filter cartridge

Excellent filter effectiveness.

Mesh size: 12-30 μm

Filter surface: 840 cm^2

Can be used with all AFRISO filter types with additional adapter. Also suitable for operation under pressure and temperatures of up to 80 °C.



Sintered plastic sieve, short

Star shape for large filter surface.

Sintered plastic sieve, long

Excellent filter effectiveness and long service life.

Filter bowl, long

Provides for a sediment space and for all standard, long filter inserts.

Sintered plastic sieves

Excellent filter effectiveness. For small and medium burner capacities. Suitable for single- and dual line operation.

Sintered plastic sieve, short

Mesh size: 50 μm (colour code: yellow)

Filter surface: 115 cm^2

Sintered plastic sieve, long

Mesh size: 35 μm (colour code: white)

Filter surface: 200 cm^2

Can be used with long filter bowl. Preferably for single line operation.

Filter bowl:

Extra long filter bowl provides for a sediment volume and space for all standard, long filter inserts.



Vacuum gauge

To check the degree of filter pollution (for installation in suction pipe).

Refer to page 115.



Felt sieve

Tubular sieve 15.3 cm^2 under felt rings (schematic representation)

Stainless steel sieve

Felt sieve

Excellent filter effectiveness. For medium and large burner capacities. Suitable for single- and dual line operation.

Mesh size: 50-75 μm .

With additional tubular sieve (filter surface: 15.3 cm^2) under the felt rings.

Disadvantage: filter fibres may come loose and get into the burner nozzles.

Stainless steel sieve

Filter effectiveness: good. For medium and large burner capacities. Suitable for single- and dual line operation.

Mesh size: 100 μm , filter surface: 48 cm^2 .

Pollution can be seen. Disadvantage: air may collect in the filter bowl.

Fuel oil filters Optimum/Opticlean

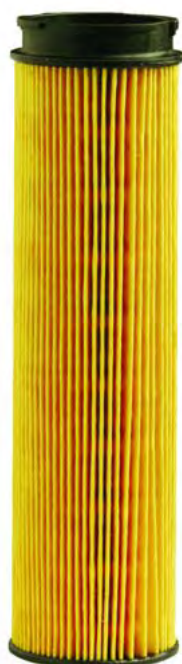


Dual-line filter Optimum



Standard version
with 50 µm sintered
plastic sieve.

Opticlean MC-18 ultra-fine filter



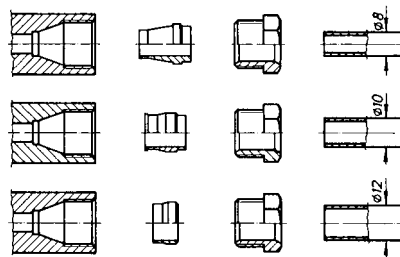
Paper filter with excellent filter
quality (5-20 µm) and long service life.
Filter surface 1850 cm².

Service box Optimum



4 sintered plastic sieves Optimum 50 µm
4 long filter bowls
4 gaskets

Universal screw connections
8+10+12 mm are included with
filters with G³/₈ connection



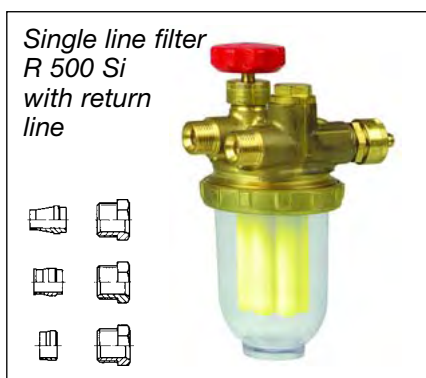
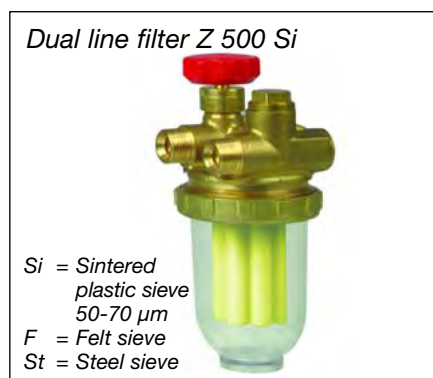
AFRISO fuel oil filters are available for single line and dual line systems as well as single line systems with a return line. The filter housing is made from brass, the filter bowl of transparent, impact resistant plastic. All filters have a shut-off valve in the supply line. Dual line filters are equipped with a non-return valve in the return line. Single line filters with return line are equipped with a vent valve with hose connection. All filters with G³/₈ connection thread are delivered with **universal** screw connections for pipes with **8, 10 and 12 mm** outside diameter. Replaceable filter inserts from paper, stainless steel, felt or sintered plastic sieves with standard bayonet connection are available for all versions. The fuel oil filter **Optimum** features an extra long filter bowl with sediment chamber for dirt particles and a star-shaped filter insert (mesh size 50 µm).

The **Opticlean** paper filter with a mesh size of 5-20 µm is recommended for ultra-fine filtering. Specially for very small burner capacities. Optimum + Opticlean ensure **optimum** protection of the nozzle and

a long service life. All AFRISO fuel oil filters are tested according to the rules of the German Institute for Building Technology and marked with the Ü mark.

DG: G	PU	Part no.	Price €
Dual-line filter Optimum	10	20413	
Single line filter R Optimum (return)	10	20276	
Single line filter V Optimum	10	20284	
Dual-line filter 1/2 - Optimum	10	20411	
Single line filter V 1/2 - Optimum	10	20285	
Sintered plastic sieve Optimum 50 µm yellow	10	20053	
Sintered plastic sieve Optimum 35 µm white	10	20049	
Service box Optimum	5	20260	
Opticlean MC-18 Ultra-fine filter 5-20 µm, long	10	20318	
Plastic filter bowl Optimum	5	20258	
Universal screw connection 8+10+12 mm	25	20409	

Fuel oil filters, spare parts for filters



Refer to page 110 for a description of the fuel oil filters.

Selection table	Part no.	Connection Tank	Burner	Universal screw connection	Filter insert	*Oil throughput l/h at Δp=100 mbar	PU	DG: G €
Dual line filter Z 500 Si	20429	2 x 3/8i	2 x 3/8a	2 x 8/10/12	Sint. plastic	200	25	
Dual-line filter Z 500 F	20428	2 x 3/8i	2 x 3/8a	2 x 8/10/12	Felt	200	25	
Dual-line filter Z 500 St	20425	2 x 3/8i	2 x 3/8a	2 x 8/10/12	Steel	220	25	
Single-line filter R 500 Si (return)	20281	1 x 3/8i	2 x 3/8a	1 x 8/10/12	Sint. plastic	210	25	
Single-line filter R 500 F (return)	20282	1 x 3/8i	2 x 3/8a	1 x 8/10/12	Felt	240	25	
Single-line filter R 500 St (return)	20283	1 x 3/8i	2 x 3/8a	1 x 8/10/12	Steel	250	25	
Single-line filter V 500 Si	20292	1 x 3/8i	1 x 3/8a	1 x 8/10/12	Sint. plastic	250	25	
Single-line filter V 500 F	20293	1 x 3/8i	1 x 3/8a	1 x 8/10/12	Felt	290	25	
Single-line filter V 500 St	20294	1 x 3/8i	1 x 3/8a	1 x 8/10/12	Steel	320	25	
Dual line filter Z 1/2-500 Si	20480	2 x 1/2i	2 x 1/2i	—	Sint. plastic	310	10	
Dual-line filter Z 1/2-500 F	20481	2 x 1/2i	2 x 1/2i	—	Felt	400	10	
Dual-line filter Z 1/2-500 St	20482	2 x 1/2i	2 x 1/2i	—	Steel	500	10	
Single-line filter V 1/2-500 Si	20485	1 x 1/2i	1 x 1/2i	—	Sint. plastic	390	10	
Single-line filter V 1/2-500 F	20486	1 x 1/2i	1 x 1/2i	—	Felt	470	10	
Single-line filter V 1/2-500 St	20487	1 x 1/2i	1 x 1/2i	—	Steel	560	10	

*at filter pollution degree of 50 %



DG: G	PU	Part no.	Price €
Opticlean MC-7 ultra-fine filter 5-20 µm, short	25	20319	
Sintered plastic sieve 50 -70 µm yellow in box of 25 pieces	25	20038	
Sintered plastic sieve 50 -70 µm yellow in box of 100 pieces	100	20045	
Sintered plastic sieve 35 µm white in box of 25 pieces	25	20035	
Sintered plastic sieve 35 µm white in box of 250 pieces	250	20027	
Felt sieve in box of 25 pieces	25	20031	
Felt sieve individually packed in re-sealable bag, in carton of 100 pieces	100	20034	
Stainless steel sieve 100 µm	25	20032	
Filter bowl plastic (suction operation)	10	20254	
Filter bowl bass (pressure operation)	10	20261	
O ring for filter bowl	10	20422	

Automatic fuel oil de-aerators Flow-Control

TÜV tested

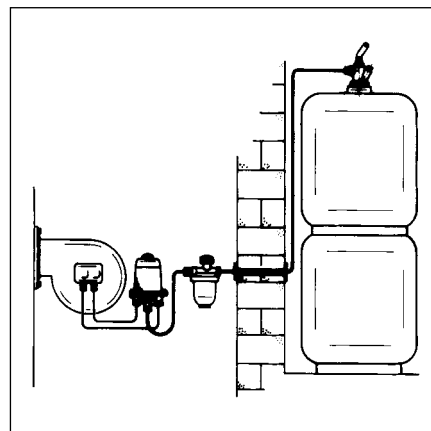
Flow-Control 3/K-1



Flow-Control 3/M

Safety float chamber

Now with connection nipple for de-aeration hose



The automatic fuel oil de-aerators Flow-Control 3/K-1 and 3/M are designed for continuous de-aeration in single line systems with return pipe connection in oil fired systems. Application areas:

Flow-Control 3/K-1 only for fuel oil EL according to DIN 51603-1.

Flow-Control 3/M for fuel oil EL according to DIN 51603-1 and diesel according to DIN EN 590 as well as biodiesel and vegetable oils (rape oil). The devices must not be subjected to undiluted additives, alcohol and acids. The max. permissible operating temperature of the standard versions is 60 °C. The special version of Flow-Control 3/M can be used at temperatures of up to 80 °C (please enquire). An oil hose with a ball-shaped sealing for 60° cone and a G^{3/8} union nut is supplied for connection to the fuel oil filter. All Flow-Control versions are TÜV-tested.

Flow-Control 3/K-1

Consists of a diecast zinc housing with female G^{1/4} connection thread at the tank side and male G^{3/8} connection threads with 60° cone to connect the burner hoses. The de-aerator hood is made from transparent plastic.

Flow-Control 3/K-1 (G^{1/4})

Similar to Flow-Control 3/K-1, but with female G^{1/4} connections at the burner side.

Flow-Control 3/M

Equipped with two separate float chambers. The first one consists of a metal de-aerator hood with an operating and a de-aerating float.

The second one is a transparent plastic safety float chamber. It prevents the oil foam from escaping via the de-aerator opening (e.g. during commissioning/filter exchange) and indicates malfunctions of the de-aerator valve.

Connection thread identical to Flow-Control 3/K-1.

Also suitable for pressure operation up to 0.7 bar.

Flow Control 3/M is recommended for mounting below the max. fuel oil level in the tank and for any application requiring particular safety.

Benefits of Flow-Control:

- Automatic operation eliminates malfunctions.
- The danger of a leak in the return pipe going unnoticed is removed. It is no longer necessary to regularly check the return pipe for leaks.
- The amount of oil drawn from the tank corresponds exactly to the oil burnt. The service life of the fuel oil filter is considerably increased in comparison to dual-line operation.
- The suction pipe can usually have a smaller diameter.

Technical specifications

Burner connection:

G^{3/8} male with 60° cone for burner hose or G^{1/4} female (part numbers 69978 and 70014)

Tank connection: G^{1/4} female, or oil hose G^{1/4} male x G^{3/8} union nut for connection to the filter.

Nozzle capacity: Max. 100 l/h

Return flow: Max. 120 l/h

Separation capacity air/gas: approx. 4 l/h

Mounting position: Float housing vertical

Ambient temp.: Max. 60 °C

Operating temp.: Max. 60 °C, special version max. 80 °C.

Operating overpressure:

Max. 0.7 bar (corresponds to static oil column of approx. 8 m).

Test pressure: 6 bar

Dimensions (W x H x D):

Flow-Control 3/K-1:

95 x 150 x 95 mm

Flow-Control 3/M:

95 x 200 x 95 mm

TÜV-tested (S 159/02)

DG: G	PU	Part no.	Price €
Flow-Control 3/K-1	25	69930	
Flow-Control 3/K-1 (G ^{1/4})	25	69978	
Flow-Control 3/M	25	69929	
Flow-Control 3/M (G ^{1/4})	25	70014	

Automatic fuel oil de-aerators with integrated filter TÜV tested

FloCo-TOP-K



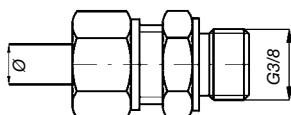
Now with
connection nipple for
de-aeration hose

FloCo-TOP-K

Automatic fuel oil de-aerator, safety version with integrated filter and stop valve for use in single-line systems with return pipe connection. Metal housing. Plastic de-aerator hood. With additional plastic hood and safety float which prevents the oil foam from escaping via the de-aerator opening. In addition, it is possible to detect malfunctions in the de-aeration system. Connections for suction and return hoses G³/₈ male thread with inner conical section. Connection to tank G³/₈ female thread. With short sintered plastic insert 50 µm and short, transparent filter bowl.

Benefits:

- Fuel oil de-aerator, filter and stop valve in a single, compact unit.
- Safety version with metal hood for universal application.
- Safety version reliably prevents oil foam from escaping.



Use cylindrical screw connections with flat gaskets at the tank end (refer to page 114).

FloCo-TOP-M



Now with
connection nipple for
de-aeration hose

FloCo-TOP-M

Similar to FloCo-TOP-K, but with metal de-aerator hood.

FloCo-Optimum-K

Similar to FloCo-TOP-K, but with long sintered plastic insert 50 µm and long, transparent filter bowl.

FloCo-Optimum-M

Similar to FloCo-TOP-K, but with metal de-aerator hood and long transparent filter bowl with long sintered plastic insert 50 µm.

Technical specifications

Burner connection: G³/₈ male with 60° cone for burner hoses

Tank connection: G³/₈ female

Nozzle capacity: Max. 100 l/h

Return flow: Max. 120 l/h

Separation capacity air/gas: 4l/h

Mounting position:

Float housing vertical

Ambient temp.: Max. 60 °C

Operating temp.: Max. 60 °C
(please enquire for higher temperatures).

Operating overpressure:

Max. 0.7 bar (corresponds to static oil column of approx. 8 m)

Test pressure: 6 bar

Dimensions (W x H x D):

FloCo-Top-K and -M:
165 x 272 x 95 mm

FloCo-Optimum-K and -M:
165 x 366 x 95 mm

Application areas:

As for Flow-Control 3/K and 3/M
(refer to page 112)

TÜV-tested (S 133 2004 V1)

FloCo-Optimum-K



Now with
connection
nipple for de-
aeration hose

Oil filter spanner

to loosen the union nut of the filter bowl and the exchange system fine filter cartridges (refer to page 114).



DG: G	PU	Part no.	Price €
FloCo-TOP-K	10	69960	
FloCo-TOP-M	10	69959	
FloCo-Optimum-K	10	69997	
FloCo-Optimum-M	10	69957	
Spanner for oil filters	25	70060	

Automatic fuel oil de-aerators with integrated filter and vacuum gauge



FloCo-TOP-KM

Automatic fuel oil de-aerator, similar to FloCo-TOP-K, but with vacuum gauge for indication of the degree of pollution of the filter. In addition, a possible static pre-pressure of up to 0.7 bar is indicated. The stop valve can be closed to check the suction capacity of the burner pump.

Our tip:

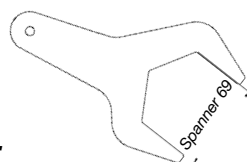
Only installation by expert companies ensures optimum operation of the automatic de-aerators as well as optimum combustion, longer nozzle and filter service life and reliable function. The expert determines the following prior to installation and compares the values with the nomograph (see right):

- Oil throughput per hour at burner nozzle.
- Inside diameter of existing oil suction pipe.
- Vacuum (overpressure) in the oil carrying pipe upstream of the burner.

The oil suction pipe is often too large. Therefore, flow speeds of 0.2 - 0.5 m/sec., required according to DIN 4755 -T2, are often not obtained in systems converted from dual line to single line operation. The nomograph on the right shows the proper values for dimensioning the suction pipe.

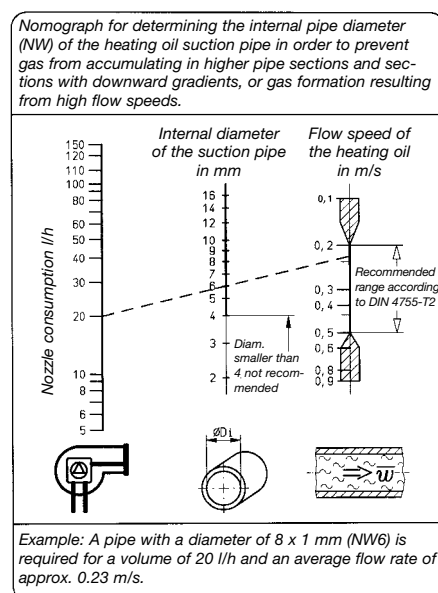
FloCo-TOP-KMF

Similar to FloCo-Top-K, but with with fine filter cartridge exchange system. Especially suited for small burner capacities due to the large filter surface (840 cm²) and ultra-fine mesh size (12-30 µm). The gauge is used to determine when the filter needs to be replaced.



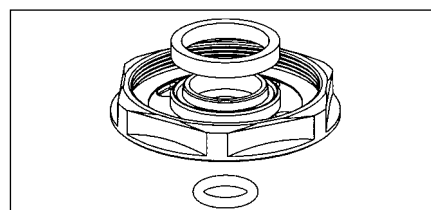
Spanner

For easy and quick use with the filter exchange adapter.



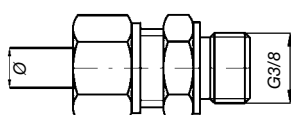
FloCo-TOP-MM

Similar to FloCo-TOP-M, but with vacuum gauge for indication of the degree of pollution of the filter and checking the suction capacity of the burner pump.



Adapter for filter exchange system

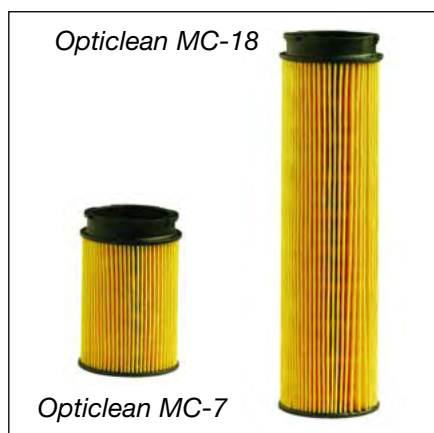
This unit can be fitted to all AFRISO filter types and can then be operated both in pressure and suction mode.



Use cylindrical screw connections with flat gaskets at the tank end.

DG: G	PU	Part no.	Price €
FloCo-TOP-KM	10	69980	
FloCo-TOP-KMF	10	69999	
FloCo-TOP-MM	10	70013	
Spare filter cartridge	10	70010	
Adapter for filter exchange system	10	70020	
Spanner for filter adapter	1	70065	
Spare vacuum gauge	1	70030	
Screw connection G ³ / ₈ x 6	1	20509	
Screw connection G ³ / ₈ x 8	10	20508	
Screw connection G ³ / ₈ x 10	10	20510	
Screw connection G ³ / ₈ x 12	10	20512	

Automatic fuel oil de-aerators with integrated Opticlean filter and vacuum gauge



Opticlean ultra-fine filters

Over the years, oil heating facilities have become genuine high-tech systems. The quality of fuel oil EL has been adapted to the requirements of state-of-the-art heating technology. Condensing oil heating systems are becoming a genuine alternative to natural gas. Low energy houses and renovated premises with optimum heat insulation require burners with minimum oil throughput. This requires a new filter technology. For this purpose, the Opticlean ultra-fine oil filters were developed. They fit into any standard fuel oil filter and ensure maximum effectiveness due to a surface up to 37 times the size of conventional filter inserts. For the first time, filter ratings of nominal 5 μm and absolute 20 μm are possible. Even smallest drops of water and emulsion are retained with high reliability. The new environmentally friendly Opticlean™ filter cartridges are free from metal and can therefore be recycled.

Filter systems which guarantee a high filter rating of 5 μm should be operated in single line systems for optimum service life. Therefore, an additional oil de-aerator should be installed if it does not already exist.



FloCo-TOP-KM-Opticlean

Automatic fuel oil de-aerator, safety version with integrated Opticlean ultra-fine filter element MC-7 and vacuum gauge to indicate the filter condition.



Vacuum gauge

For indication of the filter condition. Available for direct mounting to standard fuel oil filters. G $\frac{3}{8}$ union nut at filter end, G $\frac{3}{8}$ male thread with 60° conical fitting at burner end for burner hose. Or with G $\frac{3}{8}$ female thread x G $\frac{3}{8}$ male thread for mounting to filter with G $\frac{3}{8}$ female thread at tank end.



FloCo-Opticlean-KM

Automatic fuel oil de-aerator, safety version with integrated Opticlean ultra-fine filter element MC-18 and vacuum gauge to indicate the filter condition.



Hand-held suction pump for fuel oil

For commissioning and problem solving in the suction pipe system. With non-return valve/vent valve.

DG: G	PU	Part no.	Price €
Opticlean MC-7 ultra-fine filters 5-20 μm , short	25	20319	
Opticlean MC-18 ultra-fine filters 5-20 μm , long	10	20318	
FloCo-TOP-KM-Opticlean	10	70005	
FloCo-Opticlean-KM	10	70008	
Pressure gauge G$\frac{3}{8}$ with 60° conical	10	20400	
Pressure gauge G$\frac{3}{8}$ IG / G$\frac{3}{8}$ AG	10	20404	
Hand-held suction pump for fuel oil	10	70050	
Connecting hose for Hand-held suction pump	10	70055	

Fuel oil meters



Fuel oil meter HZ 3

For oil fired stoves operated either in suction or pressure mode. The meter increases the counter by one litre after each rotation of the pointer (= 1 litre). The oil meter HZ 3 is calibrated and displays consumption accurately to $\pm 1\%$. Very quiet operation. Suitable for fuel oil EL and diesel oil.

Technical specifications

Metering range:

0.1 - 99999 litres

Volume flow, calibrated:

0.18 - 12 l/h

Nominal pressure: 6 bar

Operating temperature range:

Max. 60 °C

Connection thread:

2 x G¹/₄ female threads

Mounting: Vertical

Dimensions W x H x D:

130 x 110 x 110 mm

PTB approval 5.223/92.02



Fuel oil meter HZ 5

For mounting between the pump and the solenoid valve directly at the burner. HZ 5 is suitable for use in suction and pressure systems. If used for suction operation, a filter must be installed upstream of the fuel oil meter. Litre indication via the roll counter is accurate to $\pm 1\%$. For pumps with integrated solenoid valve, please order an additional solenoid valve and the appropriate installation kit.

Technical specifications

Metering range:

0.1 - 99999.9 litres

Volume flow:

0.7 - 40 l/h = 0.6 - 34 kg/h

Burner capacity: 7 - 400 kW

Nominal pressure: 25 bar

Operating temperature range:

Max. 60 °C

Connection thread:

2 x G¹/₈ female thread

Mounting:

Connections facing down

Dimensions W x H x D:

60 x 85 x 60 mm



Solenoid valve for oil burners

For connection downstream of fuel oil meter HZ 5 to prevent dripping. 2/2 way version, directly controlled. Coil AC 230 V, suitable for 100 % „energised“ operation, for 3-pole AMP plug. Please order cable for plug separately.

Technical specifications

Nominal width: DN 1.7 mm

Nominal pressure: 0 - 25 bar

Operating temperature range:

Ambient: Max. 40 °C

Connection thread:

2 x G¹/₈

Dimensions W x H x D:

50 x 56 x 27 mm

Protection: IP 65 (EN 60529)

Cable for plug

Oil resistant cable with AMP plug for solenoid valve, 3 poles.

Length: 350 mm

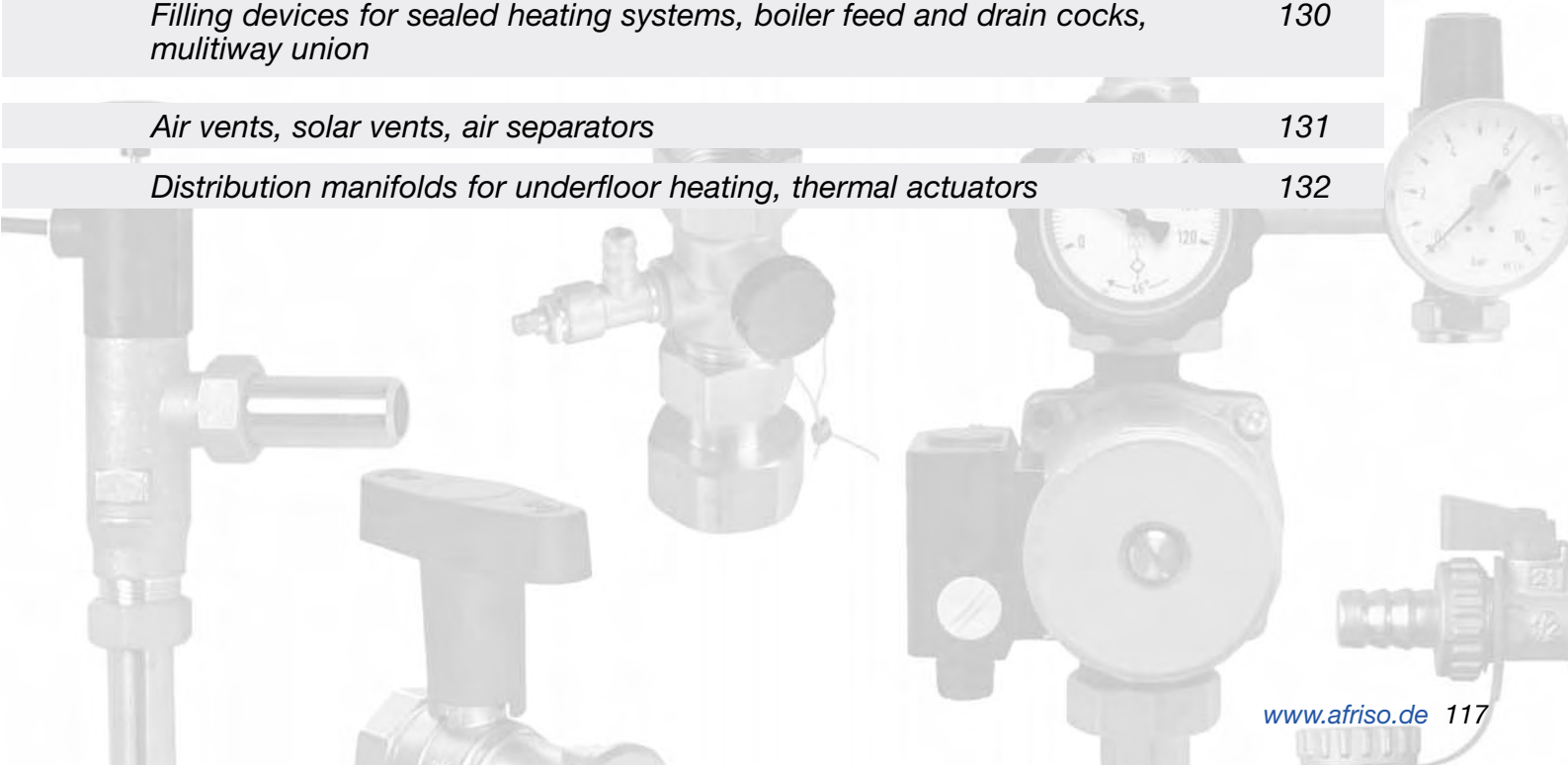
DG: H	PU	Part no.	Price €
Fuel oil meter HZ 3	1	20523	
Fuel oil meter HZ 5	1	20525	
Solenoid valve for oil burners	1	20530	
Cable for plug	1	20540	

Chapter 7

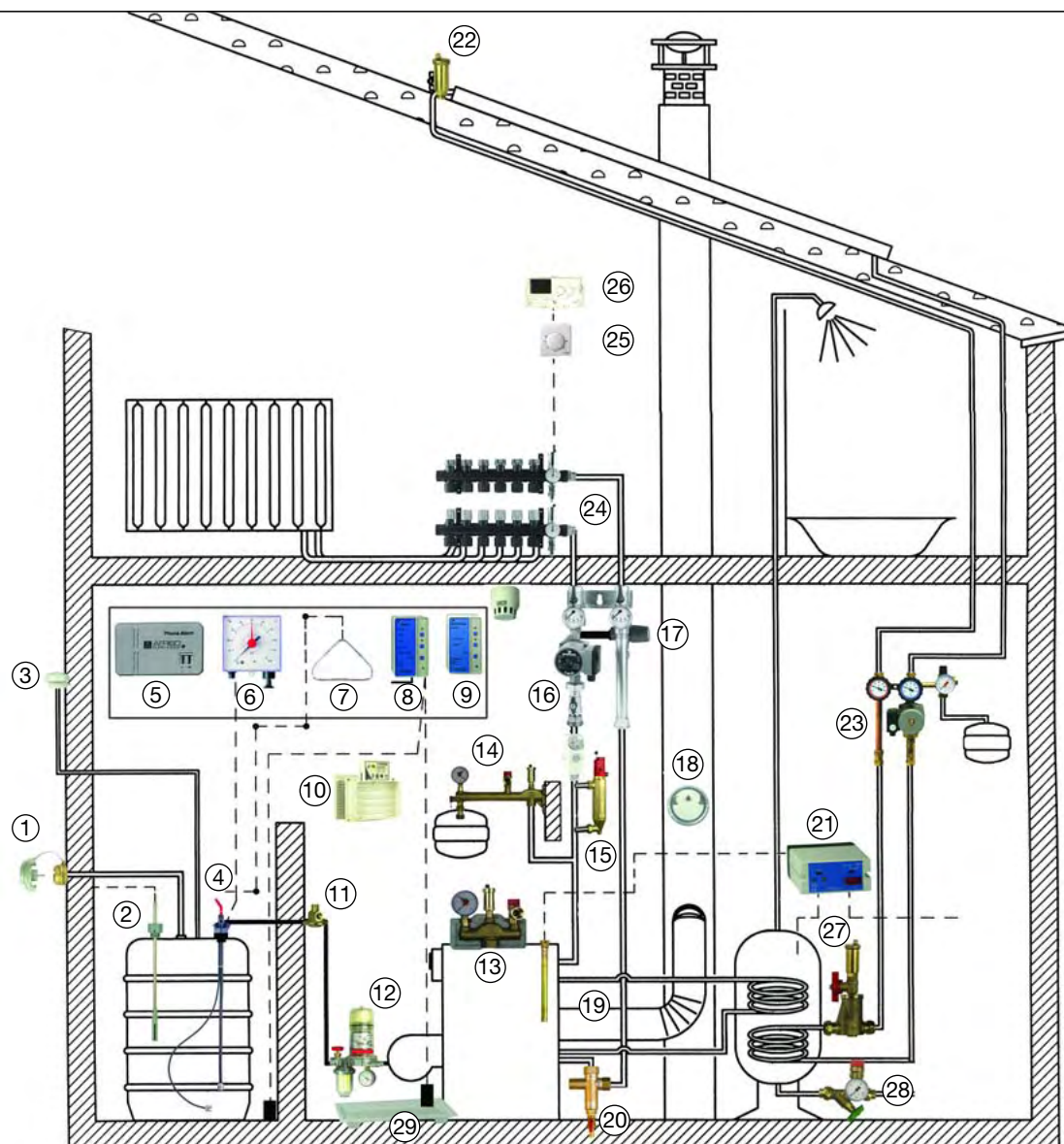
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Accessories for boilers, boiler rooms and chimneys

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07


AFRISO products in a heating system with oil burner and solar collector



In the oil storage room

- 1 GWG filler cap
- 2 Level sensor
- 3 Vent cap
- 4 Withdrawal system

Outside of the oil storage or boiler rooms

- 5 Event reporting system „Phone Alarm“
- 6 Pneumatic tank contents gauge with remote indication „Unitel“
- 7 Pull cord
- 8 Oil/water alarm unit ÖWWG 3
- 9 Electronic gas and smoke detector GRM

In the boiler room

- 10 Motorised boiler room vent „Air-Control“
- 11 Anti-siphon valve MAV
- 12 Automatic fuel oil de-aerator FloCo-TOP KMF
- 13 Boiler safety equipment group KSG
- 14 Connection assembly for expansion vessel GAK
- 15 Boiler water low level alarm WMS-WP6
- 16 Boiler connection system
- 17 Overflow valve
- 18 Draft stabiliser WZB-1
- 19 Flue gas thermometer
- 20 Flow filter
- 27 Air separator
- 28 Boiler safety group
- 29 Oil drip pan

In the living area

- 24 Distribution manifold for underfloor heating and radiators
- 25 Room thermostat
- 26 Programmable thermostat

Solar

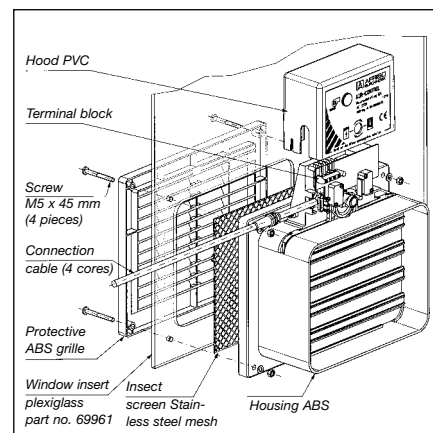
- 21 Solar controller
- 22 Solar vent
- 23 Solar pump kit with safety group

Motorised boiler room vent Air-Control

Air-Control saves heating costs, is reliable and silent.



DVGW-Reg.-Nr.: DG-4609AO0753



The burner switches off when the pre-set temperature is reached. Air-Control closes automatically.

Technical specifications

Dimensions:

W x H x D: 260 x 300 x 115 mm

Installation opening: 210 x 160 mm

Cross section of fresh air supply: 150 cm²

Supply voltage: AC 230 V

Contact rating: AC 250 V, 2 A

Protection: IP 20 (EN 60529)

Burner capacity: max. 50 kW

For larger installations several Air-Control units can be installed.

Weight: 1.0 kg

Acrylic window panel

The acrylic panel allows for the cost-efficient installation of Air-Control. The openings are exactly cut to size. Dimensions 500 x 500 mm.

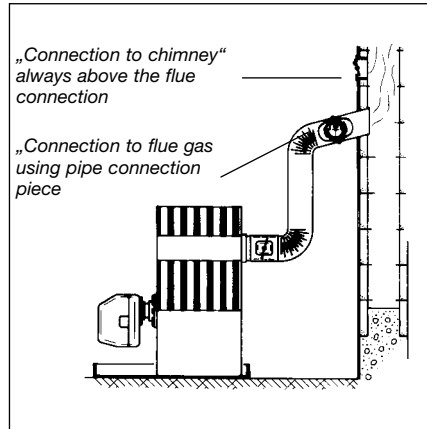
Air-Control

Motorised boiler room vent controlled by the burner, for use in boiler rooms with oil or gas fired burners with a capacity up to 50 kW. Suitable for installation in basement windows or ventilation ducts. Robust, high-impact plastic housing with injection moulded mounting flange, a counter-flange with a protective grille and a geared motor for actuating the slide. Electrical connection AC 230 V. Can also be operated manually. Function indication. Boiler rooms which are equipped with oil or gas burners must be supplied with a sufficient amount of oxygen (in accordance with FeuVo). This is often achieved by constantly open boiler room window or by air ducts. The cold air which constantly flows into the boiler room causes the boiler and the water supply as well as all pipes to cool down. As a result, the burner is switched on more frequently and consumes unnecessarily high amounts of oil or gas.

The boiler room window pane (or part of it) is removed and replaced with an acrylic panel with pre-cut openings for Air-Control. This panel measures 500 x 500 mm and has to be cut to size along two sides and then fitted into the frame. Air-Control is then mounted onto this panel and electrically connected to the boiler thermostat. Air-Control can also be mounted onto air ducts. Please observe DVGW-TRGI 86/96 and all other pertinent regulations when doing so. The window is now closed and the warmth inside is retained. As soon as the boiler temperature drops, the boiler thermostat switches on Air-Control. Opening the vent activates a microswitch which closes the burner circuit. The burner starts to operate only when Air-Control is open. The burner is supplied with pre-warmed room air in the ignition phase. The air supply damper remains open during the entire combustion process and provides the boiler room with enough fresh air (according to FeuVo) through the 150 cm³ opening.

DG: G	PU	Part no.	Price €
Air-Control	5	69964	
Acrylic window panel	5	69961	

Draft stabiliser



WZB-1 (with pipe connection piece)



Draft stabiliser WZB-1

This draft stabiliser is made of galvanised sheet steel. It ensures a constant chimney draft and keeps the chimney dry; for oil, gas or solid fuel systems. Suitable for connection to flue gas pipes with diameters from 120 to 200 mm using a pipe connection piece or to brickwork/cavity wall chimneys a special wall insert unit.

The natural chimney draft is approx. 20 to 50 Pa, depending on the height and the cross section of the chimney and the weather conditions. These values increase when the temperature increases. The draft stabiliser allows for setting the vacuum required by the manufacturer of the heating appliance (oil or gas burner/boiler combination, oil or gas furnace, etc.) and keeps this vacuum almost constant. Correct chimney draft is a prerequisite for an optimum combustion process and contributes to a reduction in heating costs.

The draft stabiliser performs the following functions:

- It limits the vacuum to the required value.
- It keeps the chimney dry and prevents soot deposits.

The flap is regulated by a weight which can be adjusted by a rotary knob. This ensures precise adjustment and optimum response. Depending on the adjustment of the weight, the flap admits more or less secondary air into the chimney when the vacuum gets too high.

Technical specifications

Adjustment range

(draft requirements): 10 to 26 Pa

Application area:

Heights of up to 20 m and chimney group I/II up to 400 cm², chimney group III up to 500 cm²

Flue gas temperature: Max. 400 °C

Mounting position:

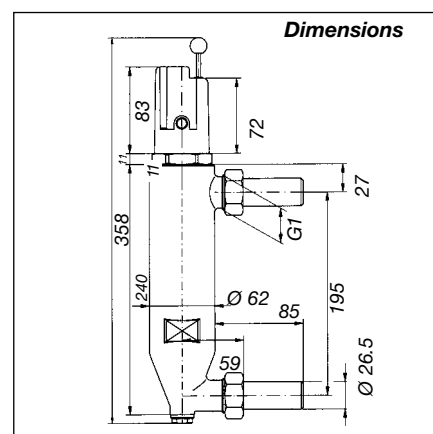
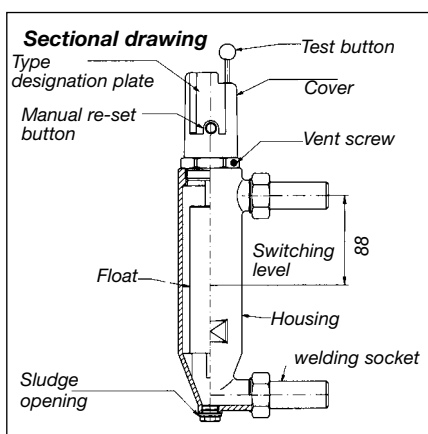
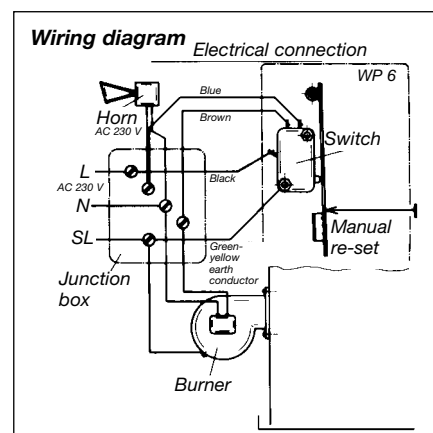
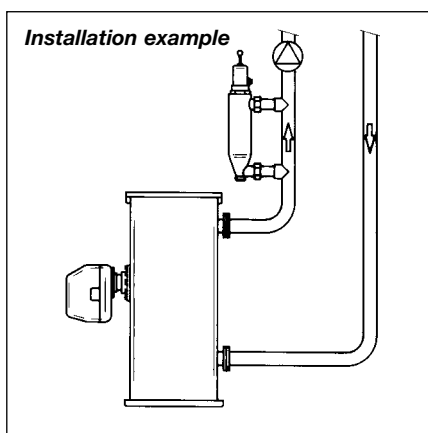
Flap axis horizontal

Flap vertical

Tightness at Δp 10 Pa: < 3 m³/h

DG: G	PU	Part no.	Price €
Draft stabiliser WZB-1	10	69760	
WZB-1 with chimney sleeve	10	69768	
Mounting sleeves:			
Chimney sleeve for WZB-1	1	69761	
Pipe connection piece Ø 120/130	1	69762	
Pipe connection piece Ø 150/160	1	69764	
Pipe connection piece Ø 180	1	69765	
Pipe connection piece Ø 200	1	69766	

Boiler water low level alarms – mechanical



WMS-WP6, brass with welding socket DN 20

This mechanical boiler water low level alarm with float for sealed heating systems according to DIN EN 12828 consists of a cast brass body with welding socket and a float mechanism, an electrical switch, test and manual re-set buttons. TÜV-tested as a water level switch for a max. operating pressure of 10 bar and a max. operating temperature of 120 °C. Designed for heating systems according to DIN EN 12828. If the water level in the boiler drops below a minimum level, a float activates a switch which interrupts the power supply to the burner. A locking mechanism prevents the burner from restarting automatically. The test button allows the float to be lowered to simulate a low water alarm condition.

Technical specifications

Housing: Cast brass
Float: Plastic
Height: 358 mm
Welding socket: DN 20
Max. operating temp.: 120 °C
Max. operating pressure: 10 bar
Test pressure: 15 bar
Contact rating: AC 250 V, 10 (3) A
Protection: IP 54 (EN 60529)
Approval: TÜV.HWB.02-232

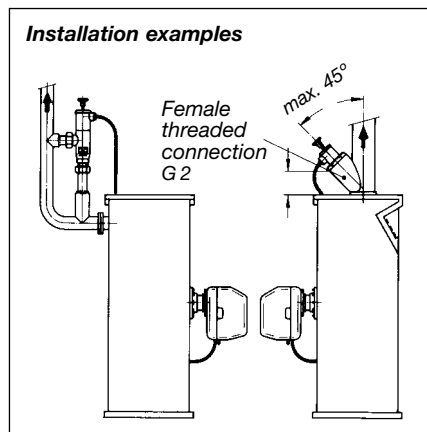
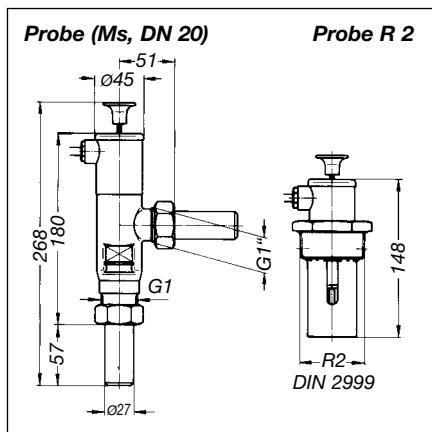
WMS-WP6, brass (without locking mechanism)

Low water level alarm switch similar to WMS-WP6, but without re-set. For use in systems where a remote control panel re-set facility is provided.

Boiler water low level alarms protect heat generators in sealed heating systems against overheating if a low water level occurs or insufficient water flow is present in the system. According to DIN EN 12828, sealed heating systems with capacities of more than 300 kW must be equipped with a TÜV-tested boiler water low level alarm system.

DG: G	PU	Part no.	Price €
WMS-WP6, brass with welding socket DN 20	15	42300	
WMS-WP6, o.V. brass with welding socket DN 20	15	42305	
Upper part WMS-WP6 with manual re-set	1	42310	
Lower part WMS-WP6 without manual re-set	1	42311	
Probe body for WMS-WP6	1	42368	

Boiler water low level alarms – electronic



Probe:
Plastic housing: Thermoplast GV
Electrode rod: Stainless steel 1.4571
Probe cable:
 HO 5 RN-F 2 x 1 mm², 1.5 m long
Pressure range: Max. 10 bar
Temperature range: Max. 120 °C
Protection: IP 54 (EN 60529)
Probe body: Cast brass
Welding sockets: Steel DN 80
Space requirements in mm:
 268 x 140, 200 x 100
Screw connection R 2:
 R2 DIN 2999, steel, galvanised

WMS 2-1 brass with welding socket DN 20

This self-monitoring electronic boiler water low level alarm with integrated power failure lock operates on the conductivity principle. Consisting of control unit with test and re-set buttons, angled probe with welding sockets, electrode and electrode test facility.

TÜV-tested and suitable as a boiler water low level alarm for a max. operating pressure of 10 bar and a max. operating temperature of 120 °C. Designed for use in heating systems according to DIN EN 12828.

According to VdTÜV sheet „Water Level 100“ of 05.2002.

If the water level in the boiler drops below a minimum level, the electrode is no longer submerged. The electronic system de-energises a relay which switches off the power supply to the burner and activates the alarm lamp. The electrical locking mechanism prevents the burner from restarting automatically.

Technical specifications

Control unit:

Supply voltage: AC 230 V

Relay contact:

1 changeover contact

Contact rating: 230 V, 2 A

Operation indicator: Green LED

Electrode voltage: 12 V max.

Temperature range: 0/+55 °C

Dimensions W x H x D:

97 x 163 x 62 mm

Protection: IP 42 (EN 60529)

Approvals:

TÜV.HWB.04-345

TÜV.HWB.04-348

WMS 3-1

Boiler water low level alarm similar to WMS 2-1, but for external power failure locking.

WMS 2-1-2

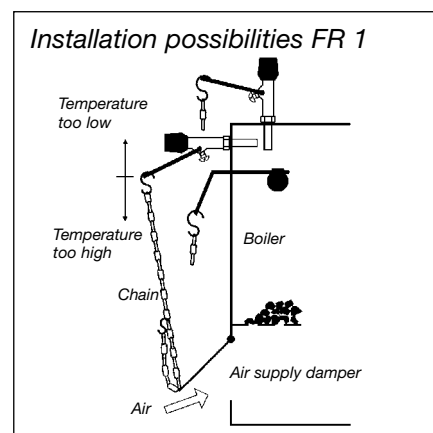
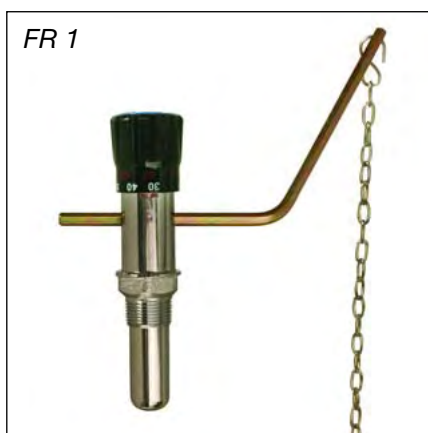
Boiler water low level alarm similar to WMS 2-1, but with probe R 2.

MS 3-1-2

Boiler water low level alarm similar to WMS 3-1, but with probe R 2.

DG: G	PU	Part no.	Price €
WMS 2-1 brass with welding socket DN 20	5	42351	
WMS 3-1, brass with welding socket DN 20	5	42352	
WMS 2-1-2	5	42364	
WMS 3-1-2	5	42365	
Control unit WMS 2-1	1	42356	
Control unit WMS 3-1	1	42357	
Probe WMS brass with welding socket DN 20	1	42362	
Probe WMS R 2	1	42366	

Thermal safety valve, combustion controller



Thermal safety valve TSK
Thermal safety valve with two independent sensor systems for solid fuel heating systems according to DIN EN 12828 with a max. heating capacity of 80,000 kcal. Also mandatory for dual fuel boilers which can be operated with solid fuels. Consisting of a brass valve housing with G³/₄ female threads at both ends, a valve, two independent bellow type probes with liquid filled temperature sensors and a G¹/₂ thermowell. Capillary tube - L = 1,300 mm - protected by flexible metal conduit. The unit is connected to the water outlet of the water heater or to the inlet of the safety heat exchanger. If the response temperature of 95 °C is exceeded, the valve is opened by the thermal probe. Cooling water is supplied to prevent the system from exceeding the maximum operating temperature.

Technical specifications

Operating pressure: Max. 10 bar
Max. temp. at capillary tube and sensor: 130 °C
Max. temp. at bellows: 110 °C
Response temp.: 95 °C
Blow-off capacity at 110 °C and Δp of 1 bar: 3,700 kg/h
Connections:
G2 x G³/₄ female thread
Connection immersion pipe:
R¹/₂ male thread
Length of immersion pipe:
200 mm

Length of capillary tube:
1,300 mm
Housing: Hot pressed brass

FR 1 combustion controller

Application
For temperature dependent adjustment of the air supply damper of solid fuel and dual fuel boilers.

Description
The FR 1 combustion controller regulates the combustion air supply. The temperature in the heat generator is detected by an integrated thermostat. The thermostat is connected to the air supply damper via a lever and a chain.
Depending on the boiler supply temperature, the air supply is controlled by opening or closing the air supply damper.

Technical specifications

Control range
30 °C/90 °C
Operating temperature range
Water: Max. 120 °C
Ambient: Max. 60 °C
Connection
R³/₄

Immersion pipe length
60 mm

Chain length
1.2 m

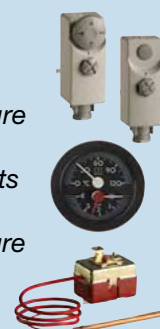
Chain load
100 to 800 g

Mounting position
Horizontal or vertical

Materials
Adjustment knob plastic
Housing brass, nickel plated
Immersion pipe brass, nickel plated
Lever steel, galvanised
Chain steel, galvanised

Please refer to chapter 10 for our complete range of „Temperature measuring instruments and controllers“.

- Thermometers
- Thermostats
- Safety temperature switches
- Room thermostats with housing
- Digital temperature controllers



DG: G	PU	Part no.	Price €
Thermal safety valve TSK	10	42370	
FR 1 combustion controller	10	42294	

Boiler safety equipment groups, safety valves

KSG



KSG – 3 bar with insulation

Pre-assembled boiler safety equipment group for sealed heating systems according to DIN EN 12828 with a capacity of up to 50 kW.

Consisting of: Carrier made of solid cast brass with G1 female boiler connection, approved safety valve $G1\frac{1}{2} \times \frac{3}{4}$, with PTFE seal ring, for flexible positioning - response pressure 3 bar, for capacities of up to 50 kW, pressure gauge for heating installations 0-4 bar $\varnothing 63$, $\frac{3}{8}$ bottom connection, with mounting valve, air vent $G\frac{3}{8}$, 12 bar, with mounting valve plus two insulation parts.

Diaphragm safety valve MS brass



Diaphragm safety valve MS brass

For sealed heating systems according to TRD 721; VdTÜV sheet Safety Valve 100 and 100/4 sheet 1; DIN EN 12828. Suitable for water heating systems according to DIN 4751-2 with supply temperatures of up to 120 °C and DIN 4751-3 with supply temperatures of up to 95 °C. Opening pressure factory pre-set to 2.5 or 3 bar. Brass housing. The size of the valve inlet determines the type of unit, the outlet is $\frac{1}{4}$ " larger.

KSG mini



KSG mini – 3 bar with insulation

Similar to KSG, but light weight version and $\varnothing 50$ mm pressure gauge.

Diaphragm safety valve with pressure gauge MSM



Diaphragm safety valve MSM

Similar to diaphragm safety valve brass, but with pressure gauge.

KSG maxi



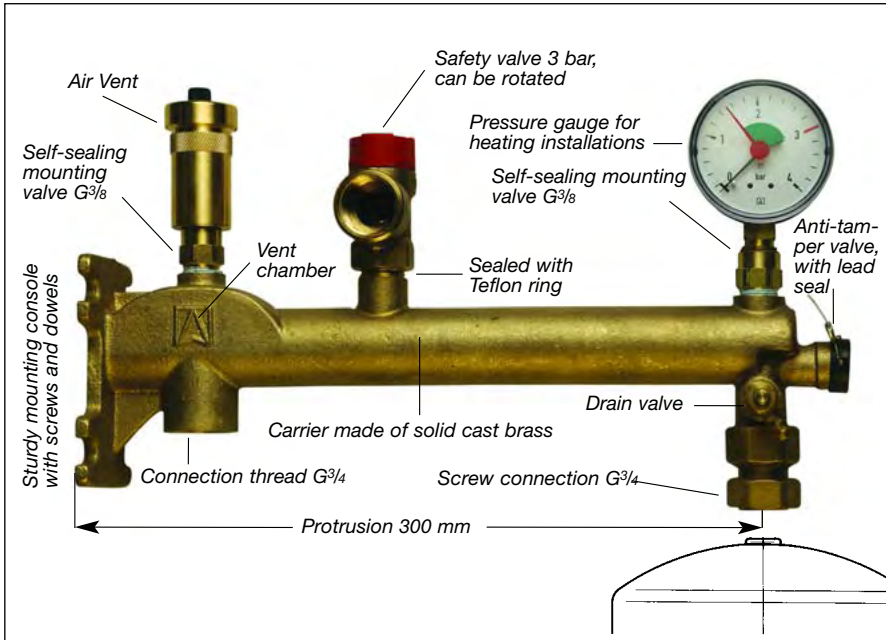
KSG maxi – 3 bar without insulation

Pre-assembled boiler safety equipment group for heating boilers with a capacity of up to 100 kW. Brass carrier, designed as multiway union, with G1 male thread boiler connection. Safety valve $G\frac{3}{4} \times 1$, can be rotated, response pressure 3 bar, for capacities of up to 100 kW. Pressure gauge for heating installations 0-4 bar, diameter $\varnothing 63\text{--}\frac{3}{8}$ back connection, with mounting valve. Air vent $G\frac{3}{8}$, 12 bar, with mounting valve. Free connection $G\frac{3}{4}$ and $G1\frac{1}{2}$ female thread.

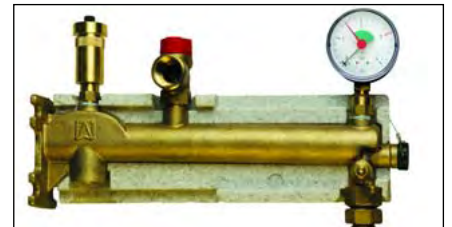
- Time saving installation with pre-assembled, leak tested assembly
- Service friendly – pressure gauge and air vent with self-sealing mounting valves, can be replaced without draining the system
- Safe venting due to top mounted connection for air vent
- Environmentally friendly – packing material is used for insulation purposes

DG: G	PU	Part no.	Price €
KSG – 3 bar with insulation	10	77938	
KSG mini – 3 bar with insulation	10	77623	
KSG maxi – 3 bar without insulation	10	77625	
MS $\frac{1}{2}$ – 2.5 bar	10	42385	
MS $\frac{1}{2}$ – 3.0 bar	10	42390	
MS $\frac{3}{4}$ – 2.5 bar	10	42386	
MS $\frac{3}{4}$ – 3.0 bar	10	42391	
MS 1 – 2.5 bar	10	42383	
MS 1 – 3.0 bar	10	42378	
MSM $\frac{1}{2}$ – 2.5 bar	10	42381	
MSM $\frac{1}{2}$ – 3.0 bar	10	42382	

Connection assembly for expansion vessel, anti-tamper valves



- Time saving installation with pre-assembled, leak tested assembly
- Service friendly: pressure gauge, air vent and expansion vessel can be replaced without draining
- Safe venting due to top mounted connection for air vent
- Environmentally friendly: packing material is used for insulation purposes



GAK 3 bar with insulation

Pre-assembled combination fitting for the connection of diaphragm expansion vessels up to 50 l in sealed heating systems according to DIN EN 12828 with a capacity of up to 50 kW.

Consisting of: Carrier made of solid cast brass with G $\frac{3}{4}$ female connection at boiler end, integrated cap valve for connection of the diaphragm expansion vessel, approved safety valve G $\frac{1}{2}$ x $\frac{3}{4}$ with Teflon sealing ring, can be rotated (response pressure 3 bar, capacity 50 kW).

Pressure gauge for heating installa-

tions Ø 63- G $\frac{3}{8}$ bottom connection (range 0-4 bar with red reference pointer) with mounting valve - self-sealing. Air vent G $\frac{3}{8}$, 12 bar, with mounting valve - self-sealing, plus two insulation parts.

The insulation is also used to package the assembly for safe transport.

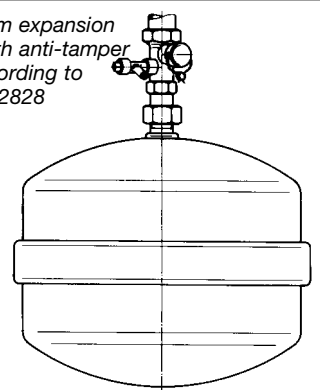
Anti-tamper valve
G $\frac{3}{4}$ x $\frac{3}{4}$



Anti-tamper valve
G1 x 1



Diaphragm expansion vessel with anti-tamper valve according to DIN EN 12828



Anti-tamper valve

Anti-tamper valve G $\frac{3}{4}$ x $\frac{3}{4}$ or G1 x 1 for diaphragm expansion vessels in heating systems according to DIN EN 12828. To be mounted at the water inlet of the expansion vessel. The cap and lead seal of the anti-tamper valve safeguard against

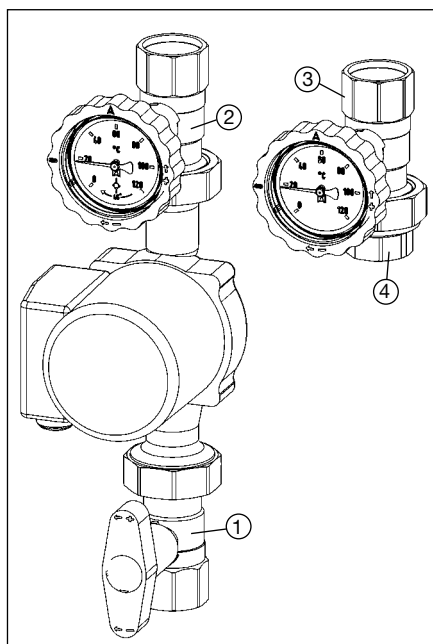
inadvertent valve closure.

The expansion vessel can be isolated from the heating system and drained via the drain valve for the required system test function or for replacement. Nominal pressure PN 10.

Max. operating temperature 120 °C.

DG: G, PU 10	Part no.	Price €
GAK 3 bar with insulation	77932	
Anti-tamper valve $\frac{3}{4}$ - $\frac{3}{4}$	77924	
Anti-tamper valve 1 - 1	77934	

Pump connection kit (without pumps), pump ball valves

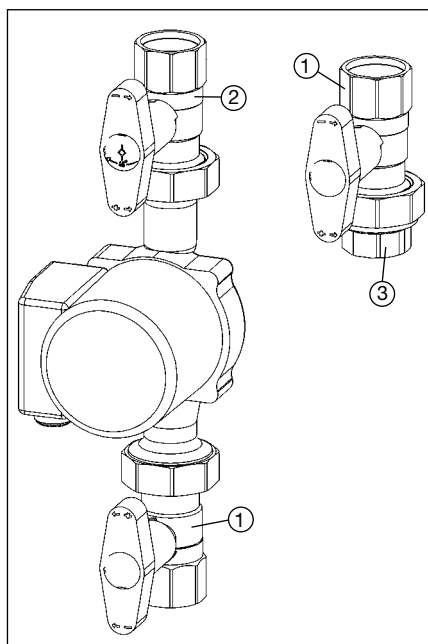


PAS 1-G1

Pump connection kit DN 20 with pipe connections G1 female thread. Max. operating pressure PN 10, max. operating temperature 110 °C. PAS 1-G1 consists of:

- ① Pump ball valve G1 female thread, at pump end with flange and union nut G1½.
- ② Combination valve G1 female thread, at pump end with flange and union nut G1½. With integrated adjustable gravity brake, with free flow setting, with thermometer (with red dial marking) in the hand wheel.
- ③ Combination valve as described above, but without gravity brake. Thermometer with blue marking.
- ④ Adapter G1½ male thread to G1 female thread.
- ⑤ Three flange gaskets (not shown).

The pump ball valves are fitted with extended operating elements to allow for pipe insulation. All parts are delivered loose in an AFRISO box.



PAS 2-G1

Pump connection kit DN 20 with pipe connections G1 female thread. Max. operating pressure PN 10, max. operating temperature 110 °C. PAS 2-G1 consists of:

- ① Two pump ball valves G1 female thread, at pump end with flange and union nut G1½.
- ② Pump ball valve G1 female thread, at pump end with flange and union nut G1½. With integrated adjustable gravity brake, with free flow setting.
- ③ Adapter G1½ male thread to G1 female thread.
- ④ Three flange gaskets (not shown).

The pump ball valves are fitted with extended operating elements to allow for pipe insulation. All parts are delivered loose in an AFRISO box.

Pump ball valve G1-T



Available with blue or red dial marking.

Pump ball valve G1-K

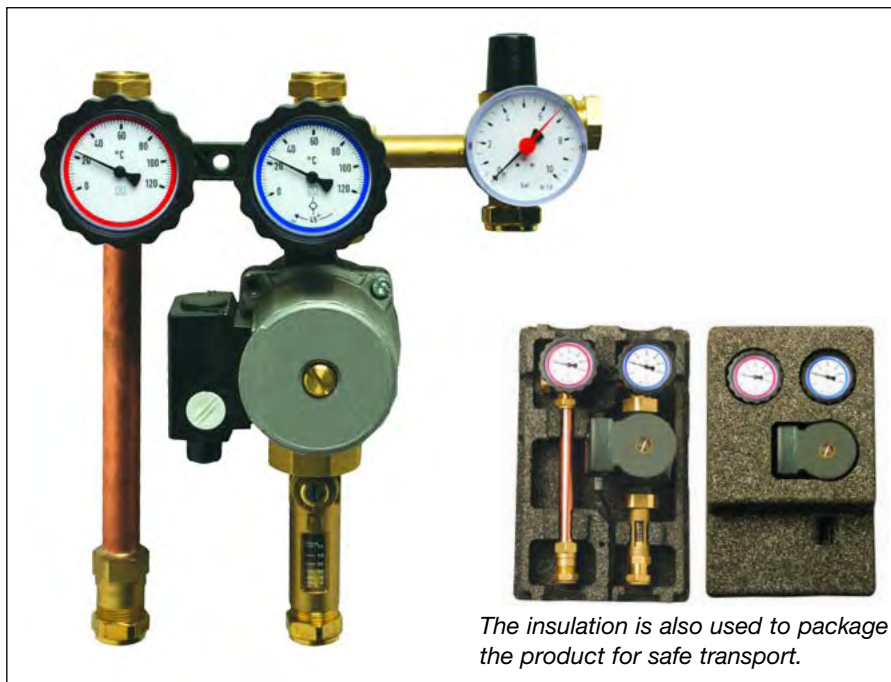


Pump ball valves

Pump ball valves and combination valves with G1 female thread, at pump end with flange and union nut G1½. Max. operating pressure PN 10, max. operating temperature 110 °C. Choice of long bar handle or hand wheel with integrated thermometer, with or without gravity brake. Union nut and seal are not included.

DG: G	PU	Part no.	Price €
PAS 1-G1	1	77630	
PAS 2-G1	1	77650	
Pump ball valve G1-K (with bar handle)	10	41944	
Pump ball valve G1-T (with blue thermometer in hand wheel)	10	41945	
Pump ball valve G1-KS (with bar handle and gravity brake)	10	41946	
Pump ball valve G1-TS (with red thermometer in hand wheel and gravity brake)	10	41947	

Solar pump stations



Solar pump station

Complete, pre-assembled and leak tested solar pump station DN 20 with all required system and safety components, including complete insulation.

- Axis distance 100 mm. Max. continuous operating temperature 120 °C, short term peak temperatures up to 160 °C.
- System connections: compression connection for Ø 22 mm (copper pipe). Please enquire for other connections.

The pump line consists of:

- Flow meter with stop valve, at pump end with flange and union nut G1½. Measuring range: either 4-16 l/min or 8-28 l/min.
- WILO circulation pump, G1½ at both ends, length 130 mm. Please enquire for other pump makes.
- Combination valve with system connection for Cu pipe Ø 22 mm, at pump end with flange and union nut G1½. With integrated adjustable gravity brake, with free flow setting, with thermometer (with blue dial marking), range 0 - 120 °C in the hand wheel.

- Safety group Ø 22 mm connection for expansion vessel. With solar safety valve 6 bar, pressure gauge Ø 63 mm, 0/10 bar, hard soldered, with mounting valve.

The supply line consists of:

- Combination valve with connections for Cu pipes Ø 22 mm at both ends, with thermometer in hand wheel (red marking, range 0- 120 °C).
- Cu pipe Ø 22 mm as length compensation, screwed to combination valve. Process screw connection for Cu pipe Ø 22 mm, hard soldered to length compensation pipe.

A wall mounting unit with accessories is shipped with the assembly.

The insulation is also used to package the product for safe transport.

Solar pump line

Complete, pre-assembled and leak tested solar pump line DN 20 with all required system and safety components, including complete insulation. Scope of delivery similar to solar pump station, but without supply line.

Please refer to pages 157, 158 for solar controllers.

For OEM customers we supply ready-to-install pre-assembled solar pump stations and solar pump lines. The assemblies are manufactured to exact customer specifications.

Please enquire.

Overflow valve, ball valves, pump ball valves



DÜ with screw connection

Differential pressure overflow valve with adjustment scale for keeping a constant pump pressure in sealed heating systems and for suppressing flow noise. Housing made of brass, angled version.

G³/₄ female thread inlet connection, outlet end screw connection with union nut G³/₄ and flat seal.

Operating temperature:

Max. 120 °C

Operating pressure: Max. 6 bar

Differential pressure:

Adjustable up to 0.5 bar



Ball valve MS 58, nickel plated

For water (no steam or vapour).

Female x female, full ball, full flow, T handle, long.

Operating temperature:

Max. 100 °C

Operating pressure: Max. up to PN 40 depending on nominal width and temperature.



Ball valve MS 58, brass, bare metal surface

For drinking water according to E-DIN 3433 (Nov. 1988), DIN-DVGW. Female x female, full ball, full flow, T handle, long.

Operating temperature:

Max. 110 °C

Operating pressure: Max. up to PN 10 depending on nominal width and temperature.



Pump ball valve, nickel plated

For heating installations. One end with female thread, the other end with flange, without union nut. With or without gravity brake.

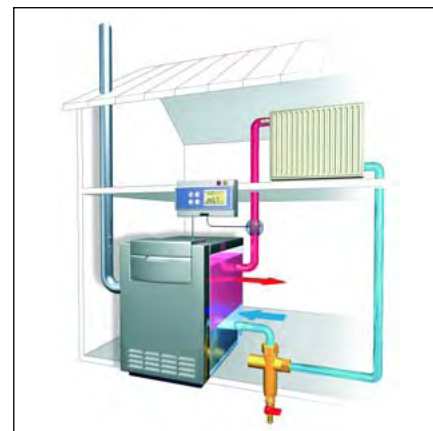
Operating temperature:

Max. 110 °C

Operating pressure: Max. PN 10

DG: G	PU	Part no.	Price €
DÜ with screw connection	10	42379	
Ball valve MS 58, nickel plated			
Ball valve G¹/₂	1	42046	
Ball valve G³/₄	1	42047	
Ball valve G1	1	42048	
Ball valve G1¹/₄	1	42049	
Ball valve G1¹/₂	1	42050	
Ball valve G2	1	42051	
Ball valve MS 58, brass, bare metal surface, for drinking water			
Ball valve G¹/₂	1	42040	
Ball valve G³/₄	1	42041	
Ball valve G1	1	42042	
Ball valve G1¹/₄	1	42043	
Ball valve G1¹/₂	1	42044	
Ball valve G2	1	42045	
Pump ball valve G1, without gravity brake, without union nut	10	42037	
Pump ball valve G1, with gravity brake, without union nut	10	42036	
Pump ball valve G1¹/₄, without gravity brake, without union nut	10	42039	
Pump ball valve G1¹/₄, with gravity brake, without union nut	10	42038	

Flow filter/air flow filter



Application

Flow filters and air flow filters remove lime, rust, sludge, dirt and gas from heating systems and ensure clean water and trouble-free operation. Suitable for hot water heating systems, underfloor heating systems, solar systems (special versions, please enquire), fuel cells and renovation of system components (sludge removal). Also suitable for removing lime in the circulation circuit of non-potable water facilities.

Description

Most advanced heating systems use water for heat transmission. However, this water also transports unwanted substances such as lime, calcium, magnesium, oxide, carbonates as well as larger particles such as welding or soldering residue, metal chips and dirt. These substances may cause malfunctions in fittings and control units. A compact flow filter (particle separator) was developed to remove these particles from the water. The particles settle in the collection chamber of the filter and can be flushed out via a cock with small amounts of water. Clean water ensures trouble-free operation of systems and reduces fuel and maintenance costs.

Clean system components have a better thermal conduction, they ensure quicker warming up and thus contribute to reduced fuel consumption and emission.

The combined air/flow filter was developed for heating systems which are subject to problems caused by oxygen or other gases. The de-aeration valve automatically removes the gases.

In the case of non-potable water, the flow filter is installed in the circulation circuit. Lime particles settle in the flow filter and can be flushed out. This reduces the deposits in pipes and fittings. Special materials which are suitable for drinking water were used for this application.

Technical specifications

Housing

Cast brass

Operating pressure

Max. 10 bar

Operating temperature

Max. 95 °C

Dimensions (W x H x D):

Flow filter: 120 x 194 x 60 mm

Air/flow filter: 120 x 394 x 60 mm

Connections

Flow filter: Inlet G³/₄

Outlet G1

Air/flow filter: 2 x G³/₄

Scope of delivery

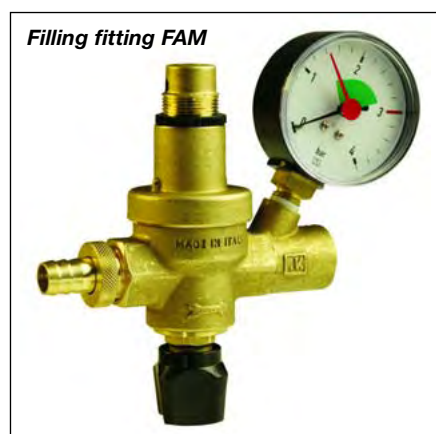
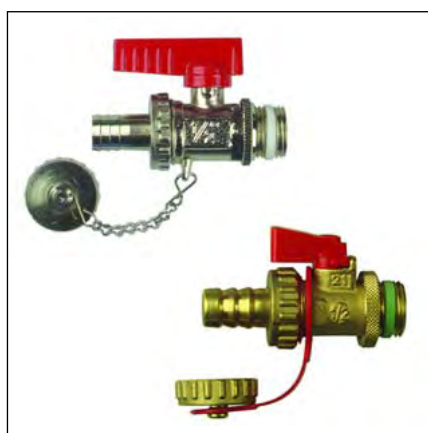
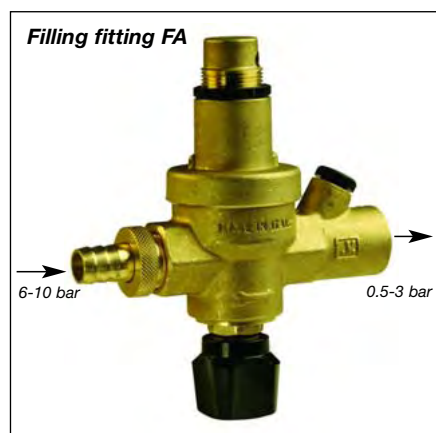
Flow filters and air/flow filters are delivered with foam insulation.

Benefits

- Suitable for open and sealed systems
- Also suitable for the precipitation of lime in the circulation circuit of non-potable water systems
- Reliable function principle without filter sieve
- Flushing possible during normal system operation
- Easy and cost effective installation
- Cost savings due to fewer malfunctions and longer service life of the installation
- Energy savings due to improved heat transfer with clean system components

DG: G		PU	Part no.	Price €
Flow filter - heating	28 kW	5	78210	
Flow filter - heating	50 kW	5	78211	
Air/flow filter - heating	28 kW	5	78212	
Air/flow filter - heating	50 kW	5	78213	
Flow filter - non-potable water	---	5	78214	

Filling fittings for sealed heating systems, boiler feed and drain cocks, multiway union



KFE cock Ms, brass, nickel plated

KFE cock Ms, brass, bare metal surface

Boiler feed and drain cock. Ball valve version made from brass. Connections: G $\frac{1}{2}$ male thread with PTFE sealing ring and locking nut, and $\frac{1}{2}$ " male hose connection with G $\frac{3}{4}$ union nut and blind cap with chain or strap. Available in plain brass or nickel plated brass.

144 pieces in cardboard box.

KFE cock, heavy duty version.

25 pieces in AFRISO box.

Angled G $\frac{3}{4}$ x $\frac{3}{4}$



Filling fitting FA

Filling fitting FAM

Filling fitting for sealed heating systems according to DIN EN 12828. Housing and spring cap are made from brass. Inlet $\frac{1}{2}$ " male hose connection, outlet G $\frac{1}{2}$ female thread. With G $\frac{1}{4}$ connection for pressure gauge for heating installations. With pressure reducer, stop valve and backflow preventer. Pre-pressure 6 to 10 bar, outlet pressure adjustable between 0.5 and 3 bar. Type FAM is similar to type FA, but with pressure gauge for heating installations $\varnothing$ 50 mm, 0/4 bar, G $\frac{1}{4}$ bottom.

DG: G	PU	Part no.	Price €
Filling fitting FA	5	42405	
Filling fitting FAM	5	42406	
KFE cock brass, bare metal surface, heavy duty version in AFRISO box	25	42404	
KFE cock brass, bare metal surface, in cardboard box	144	42401	
KFE cock brass, nickel-plated, in cardboard box	144	42407	
Multiway union	10	77985	
Angled G$\frac{3}{4}$ x $\frac{3}{4}$	10	77987	

Multiway union

Union for the efficient connection of various pipes and for professional installation of fittings, safety components, indicators or sensors. Sealing of the male threads with Teflon rings and cast outer parts for hexagonal spanners ensure fast installation and safe positioning of the parts screwed into the union.

Operating pressure: Max. 10 bar

Operating temperature: Max. 120 °C

Connections:

2 x G $\frac{1}{2}$ female thread
1 x G $\frac{3}{4}$ male thread with PTFE sealing ring
1 x G $\frac{3}{4}$ female thread
1 x G1 female thread
1 x G1 male thread with PTFE sealing ring

Air vents, solar vents, air separators

Air vent G^{3/8}



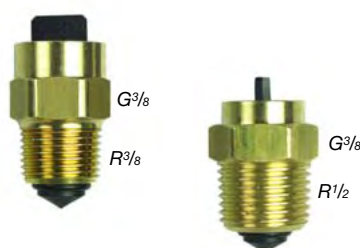
Air vent G^{1/2}

Air vent 12 bar with valve ^{3/8}

Quick action air vent with ^{3/8}" mounting valve, suitable for up to 12 bar/110 °C. Perfect design in terms of appearance and function (high, narrow shape). Made from precision turned brass parts. Cover made from high grade glassfibre reinforced plastic. Brass union ring. R^{3/8} connection, self-sealing. 25 pieces in AFRISO box.



Mounting valves



**Air vent
G^{1/2} angled version**



Solar vent

Air vent for operating temperatures up to 150 °C, max. operating pressure 6 bar. Housing made from precision turned brass parts, all functional parts made from temperature resistant plastic. G^{3/8} connection with O ring seal.



Solar vent with valve

With ball valve G^{3/8} x ^{3/8} as shut-off unit. Max. operating temperature 150 °C, max. operating pressure 6 bar.

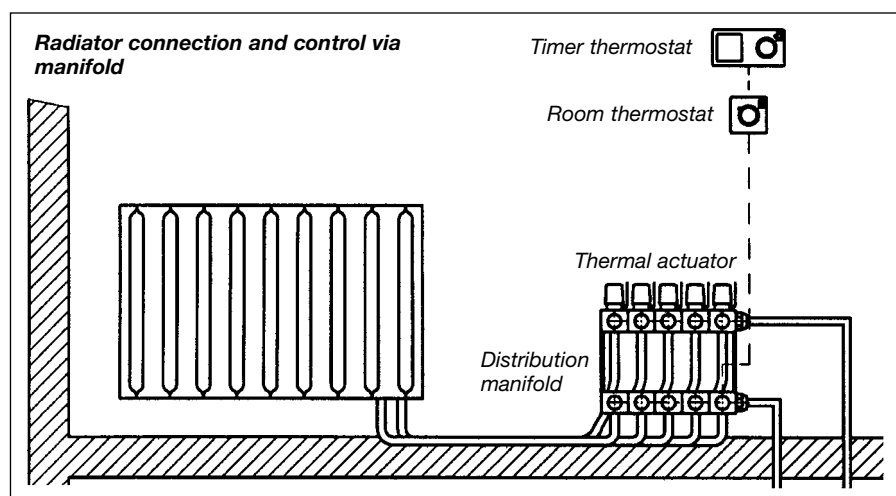
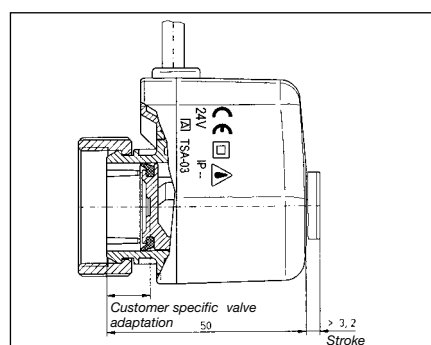
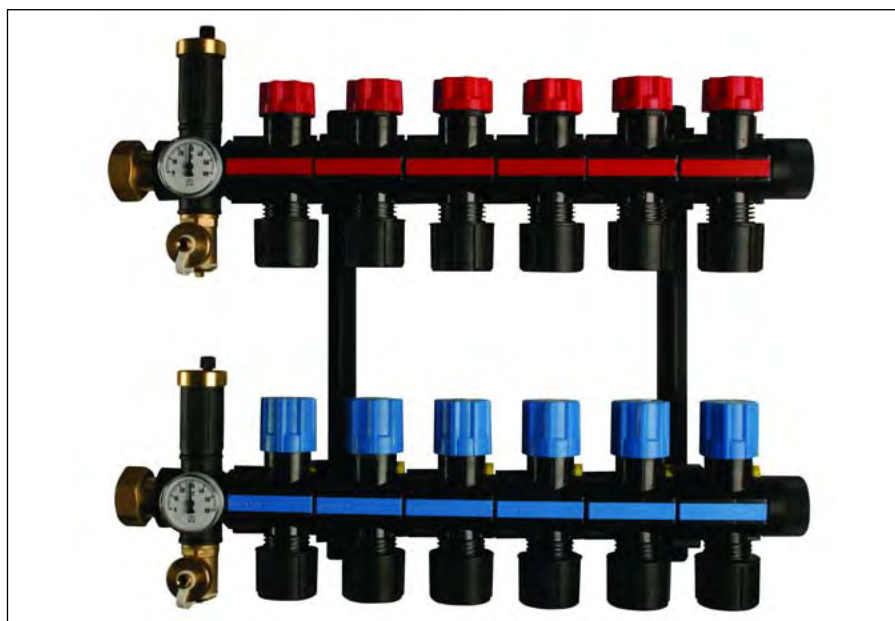
Air separator

Air separator for use in solar systems and in sealed heating systems. The air separator removes the air contained in the heat transfer medium. The air collects in the housing and can be discharged via an air vent or a manual vent valve connected via the G^{3/8} threaded connection. Compression screw connection for Cu pipes Ø 22 mm at both ends. Housing material: brass

Operating pressure: Max. 6 bar
Operating temperature:
 Max. 150 °C

DG: G	PU	Part no.	Price €
Air vent 12 bar with valve ^{3/8}	25	77700	
Air vent 12 bar with valve ^{1/2}	25	77706	
Air vent G^{1/2} without valve	25	77752	
Air vent G^{1/2} angled version housing hot pressed brass, nickel plated, with aquastop	10	77753	
Mounting valve R^{3/8} x G^{3/8}	25	77720	
Mounting valve R^{1/2} x G^{3/8}	25	77723	
Solar vent	25	77900	
Solar vent with valve	25	77996	
Air separator	10	77851	

Distribution manifold for underfloor heating systems and radiator connection, thermal actuators



Thermal actuators

To operate hot water valves in distribution manifolds for underfloor heating systems or on radiators. Thermal actuators convert the electric signal they receive from room thermostats or thermostats with timers into a stroke from 0 to 3 mm. For easy function control, the valve stroke is visible from the outside. The thermal actuators are available in the following versions:

Distribution manifolds

We supply OEM customers with distribution manifolds and accessories made from high quality plastics, covering a multitude of different applications, predominantly for underfloor heating systems, radiator connection, distribution of non-potable water and tool cooling. Our accessories include thermal actuators and suitable electronic control units in addition to the complete range of connection fittings. We manufacture many of these products to specific customer requirements.

Radiator connection

Via distribution manifolds with integrated actuators for temperature control as well as adjustment and shut-off units.

- Optimum temperature detection using electronic room sensors.
- Lower heating costs due to timer control for individual radiators or heating areas.
- Optimised radiator design without unnecessary fittings.

- All standard operating voltages such as 230 V, 24 V, 12 V
- Closed when de-energised
- Union nut 28 x 1.5 mm or 30 x 1.5 mm (other connection types and adapters are available)

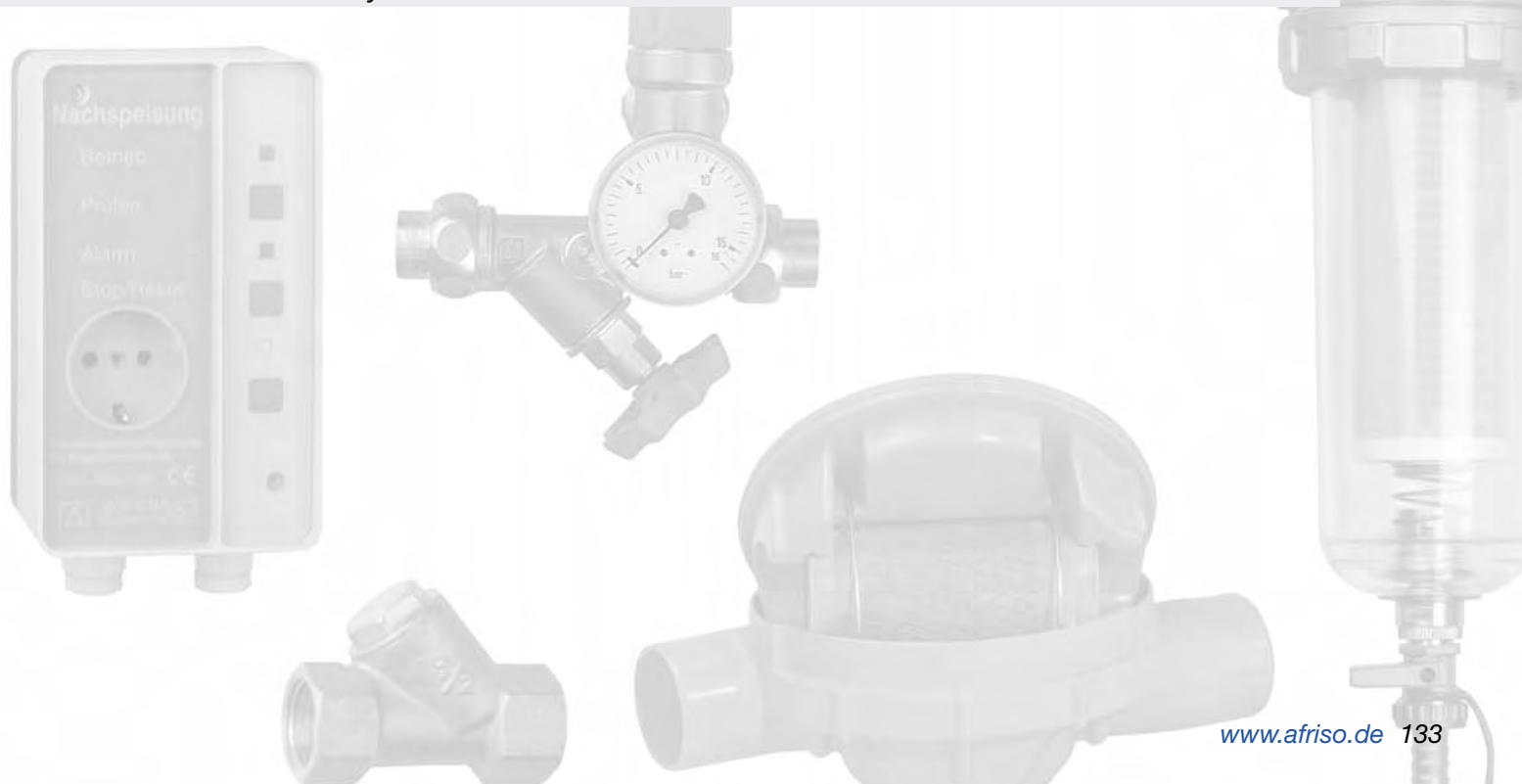
We manufacture many of these products to specific customer requirements. Many years of experience in measurement and control technology and in manufacturing plastic products to meet high technological demands allow us to develop and build all required components - one stop shopping at its best. We look forward to your enquiry.

Chapter 8

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Accessories for potable water supply and rain water harvesting. Water treatment

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Pressure reducers, filters, non-return valves, strainers



New design and technology

Filter

Hot-pressed brass design, replaceable stainless steel sieve specially for water. Max. operating pressure 16 bar.



Non-return valve

Brass construction, suitable for water, also suitable as a gravity brake. Nylon valve, seal seat NBR, stainless steel spring. Temperature up to 110 °C. „Up to 1“ size: 12 bar operating pressure, larger sizes: 10 bar operating pressure.

Strainers for non-return valves

Stainless steel sieve Aisi 316, nylon connection piece. Max. operating temperature 110 °C. Mesh size 1.7 mm², 16 holes per cm².

Pressure reducer DMI

Pressure reducer for water. Housing and spring cap as well as all functional parts are made from brass. Stainless steel seal seat. G¹/₄ connections at both ends for pressure gauges. Available with various screw connections, female threads at both ends. Admission pressure up to 16 bar, other side adjustable between 1.5 and 6 bar.

DG: G, PU 5	Part no.	Price €
DMI 1/2	42430	
DMI 3/4	42431	
DMI 1	42432	

DG: G	PU	Part no.	Price €
Filter 3/8	25	42580	
Filter 1/2	25	42581	
Filter 3/4	25	42582	
Filter 1	25	42583	
Filter 1 1/4	25	42584	
Filter 1 1/2	25	42585	
Filter 2	25	42586	
Non-return valve 3/8 - DN 10	25	42540	
Non-return valve 1/2 - DN 15	25	42541	
Non-return valve 3/4 - DN 20	25	42542	
Non-return valve 1 - DN 25	25	42543	
Non-return valve 1 1/4 - DN 32	25	42544	
Non-return valve 1 1/2 - DN 40	25	42545	
Non-return valve 2 - DN 50	25	42546	
Strainer 3/8 - DN 10	50	20811	
Strainer 1/2 - DN 15	35	20812	
Strainer 3/4 - DN 20	20	20813	
Strainer 1 - DN 25	25	20814	
Strainer 1 1/4 - DN 32	20	20815	
Strainer 1 1/2 - DN 40	10	20816	
Strainer 2 - DN 50	6	20817	

Please refer to pages 454 and 455 for water pressure instruments.

Water filter with replaceable filter element, backwash water filters



With replaceable filter element



Backwash filter



Connection can be rotated



Application

DIN 1988 requires the installation of suitable filters in drinking water systems to prevent corrosion. At the same time, the filters prevent particles such as rust or sand from reaching the domestic water installation and protect valves, machines, boilers, etc. from malfunctions caused by dirt. Also suitable for high flow rates.

Description

Solid water filter. Cast brass filter head. The brass connection piece can be rotated to facilitate installation in horizontal or vertical pipes, even if the pipe is very close to a wall. The filter insert consists of a plastic filter carrier with a stainless steel filter element with a lower rating of 90 µm and an upper rating of 125 µm. The transparent filter bowl, made from impact resistant plastic, shows the degree of pollution. The filter bowl with an O ring seal is screwed to the filter head using a brass union nut. A pressure gauge with the measuring range 0-10 bar or 0-16 bar to indicate the inlet pressure is included. The cover can be rotated to mark the date of the last filter replacement or backwashing.

The backwash filter has a 7" filter insert, the filter without backwashing facility has an insert of 8 1/2". Backwashing is performed manually via a drain valve. The direction of flow through the filter is reversed and the dirt particles are washed

out of the filter. The owner can easily backwash the filter himself. This should be done at intervals of 2 months. Filter inserts of filters without backwashing facility must be replaced at regular intervals of no more than 6 months. A filter spanner is included with this filter version. The materials are non-toxic and comply with the German Drinking Water Act.

Technical specifications

Medium: Drinking water

Operating pressure: 10 bar/16 bar (observe measuring range of pressure gauge!)

Operating temperature: Max. 30 °C

Mounting position: Vertical

Connection: G³/₄,
G1 optional,
can be rotated

Dimensions W x H x D:

Backwash version:
178 x 360 x 208 mm

Version without backwash facility:
178 x 320 x 208 mm

Filter rating

Lower 90 µm
Upper 125 µm

Material:

Filter head: Cu Zn 40 Pb 2

Connection pieces: Cu Zn 40 Pb 2

Filter bowl: Plastic
(Trogamit T)

Filter sieve: Stainless steel

Scope of delivery

Filter complete with connection piece.

Pressure gauge 10 bar (alternative: 16 bar) with date indicator.

Version without backwash facility includes filter spanner.

DG: G; PU: 1	Connections	Part no.	Price €
Water filter with replaceable filter element 8 1/2"	G ³ / ₄	42690	
Water filter with replaceable filter element 8 1/2"	G1	42691	
Backwash water filter 7"	G ³ / ₄	42688	
Backwash water filter 7"	G1	42693	
Spare sieve (replaceable filter element) 8 1/2"		42700	
Filter spanner		42701	
Spare pressure gauge 10 bar with date indicator	G ¹ / ₄ axial	63544	
Spare pressure gauge 16 bar with date indicator	G ¹ / ₄ axial	63545	

Water filters with pressure reducer



Without backwash facility



With backwash facility



Pressure gauge with date indicator



Application

Combination fitting consisting of water filter, pressure reducer and backflow preventer providing a complete domestic drinking water station. The water filter prevents particles from reaching the domestic water installation. The pressure reducer reduces the pressure to a uniform, system-specific pressure in order to protect the installation and to ensure economic water consumption. The backflow preventer (optional) prevents water flowing back from the domestic water installation into the public water supply.

Description

Solid construction combination fitting consisting of water filter, pressure reducer and backflow preventer. Brass filter head with integrated pressure reducer housing. The brass connection piece can be rotated to facilitate installation in horizontal or vertical pipes, even if the pipe is very close to a wall. The filter insert consists of a plastic filter carrier with a stainless steel filter element with a lower rating of 90 µm and an upper rating of 120 µm. The transparent filter bowl, made from impact resistant plastic, shows the degree of pollution. The filter bowl with an O ring seal is screwed to the filter head using a brass union nut. The pressure reducer is factory pre-set to 4 bar output pressure and can be adjusted to any value from 1.6 to 6 bar. A pressure gauge with measuring range 0/10 bar to indicate the outlet pressure is included.

The rotatable cover allows you to mark the date of the last filter replacement or backwashing. The backwash filter has a 7" filter insert, the filter without backwashing facility has an insert of 8 1/2".

Backwashing is performed manually via a drain valve. The direction of flow through the filter is reversed and the dirt particles are washed out of the filter. The owner can easily backwash the filter himself. This should be done at intervals of 2 months. The filter inserts of filters without backwashing facility must be replaced at regular intervals of no more than 6 months. A filter spanner is included with this filter version. The backflow preventer (optional) can be fitted in lieu of the connection fitting. The materials are non-toxic and comply with the German Drinking Water Act.

Technical specifications

Medium: Drinking water
Operating pressure: Min. 2 bar, max. 16 bar
Output pressure: Adjustable from 1.6 bar to 6 bar
Operating temperature: Max. 30 °C

Mounting position: Vertical

Connection: G³/₄,
G1 optional,
can be rotated

Dimensions: W x H x D

Backwash version: 178 x 420 x 208 mm

Version without backwash facility: 178 x 380 x 208 mm

Filter rating:

Lower 90 µm
Upper 125 µm

Material:

Filter head: Cu Zn 40 Pb2

Connection pieces: Cu Zn 40 Pb2

Filter bowl: Plastic
(Trogamit T)

Filter sieve: Stainless steel

Scope of delivery

Filter with pressure reducer, complete with connection piece. Pressure gauge 10 bar (optional 16 bar) with date indicator. Version without backwash facility includes filter spanner.

Option

- Backflow preventer

DG: G; PU: 1	Connections	Part no.	Price €
Water filter with pressure reducer (replaceable filter element 8 1/2")	G ³ / ₄	42683	
Water filter with pressure reducer (replaceable filter element 8 1/2")	G1	42684	
Water filter with pressure reducer (backwash version)	G ³ / ₄	42681	
Water filter with pressure reducer (backwash version)	G1	42686	
Backflow preventer	G ³ / ₄	42705	
Backflow preventer	G1	42706	

Boiler safety groups, safety valves



Boiler safety group BFK 12/10

Safety group fitting for sealed water heaters according to DIN 1988 or DIN 4753-1, designed to protect against overpressure. Noise characteristics according to DIN 4109 class 1.

Combination fitting with safety valve 10 bar, shut-off facility, non-return valve and test screw. Clamp ring connection Ø 15 mm at both ends.

Available with various connections as well as safety valve 6 and 8 bar. Length and height 95 mm.



Boiler safety group DN 15

Similar to BFK 12/10, but with additional Bourdon tube pressure gauge 0-16 bar, Ø 50 mm, connection G¹/₄. Safety valve can be rotated, outlet thread G³/₄. With soldered screw connection Ø 18 mm at both ends.

Also available with safety valve and pressure gauge in other pressure ranges.

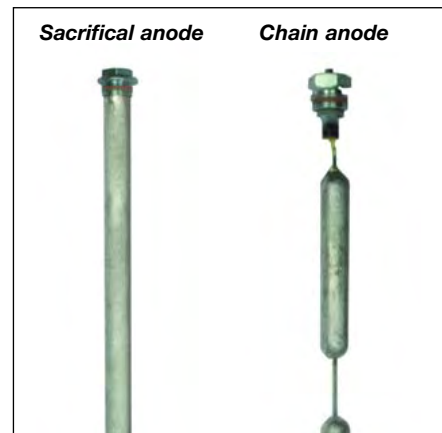
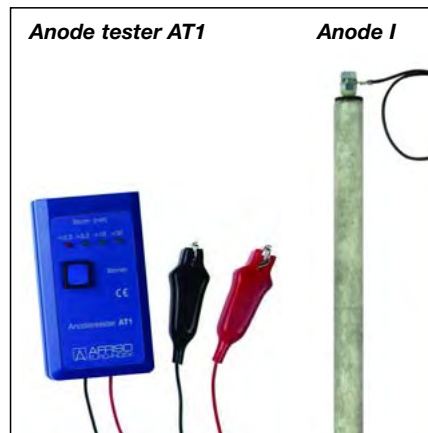
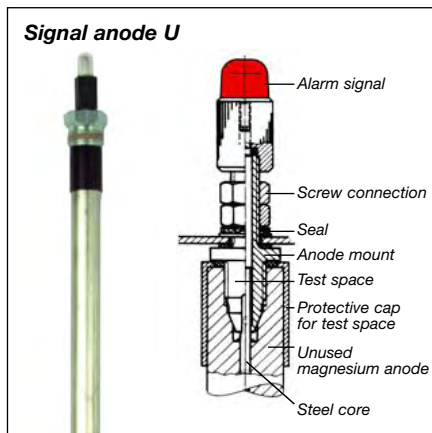


Diaphragm safety valve MSW for water heaters

According to TRD 721 and VdTÜV sheet Safety Valve 100. Suitable for sealed drinking water heaters according to DIN 1988 and DIN 4753 T1. The safety valve must be installed as per DIN 1988 in the cold water inlet of the drinking water heater. The release pressure of the safety valve is factory pre-set. The size of the valve inlet determines the unit type, the outlet is 1/4" to 1/2" larger.

DG: G	PU	Part no.	Price €
Boiler safety group BFK 12/10	10	77988	
Boiler safety group DN 15	10	77976	
Diaphragm safety valves for water:			
MSW 1/2 x 3/4, 6 bar	10	42421	
MSW 1/2 x 3/4, 8 bar	10	42422	
MSW 1/2 x 3/4, 10 bar	10	42423	
MSW 3/4 x 1, 6 bar	10	42425	
MSW 3/4 x 1, 8 bar	10	42426	
MSW 3/4 x 1, 10 bar	10	42427	
MSW 1 x 1 1/4, 6 bar	10	42442	
MSW 1 x 1 1/4, 8 bar	10	42443	
MSW 1 x 1 1/4, 10 bar	10	42444	
MSW 1 1/4 x 1 1/2, 6 bar	10	42446	
MSW 1 1/4 x 1 1/2, 8 bar	5	42447	
MSW 1 1/4 x 1 1/2, 10 bar	5	42448	
MSW 1 1/2 x 2, 6 bar	5	42476	
MSW 1 1/2 x 2, 8 bar	5	42477	
MSW 1 1/2 x 2, 10 bar	5	42478	
MSW 2 x 2 1/2, 6 bar	1	42487	
MSW 2 x 2 1/2, 8 bar	1	42488	
MSW 2 x 2 1/2, 10 bar	1	42489	

Signal anodes, sacrificial anodes



The signal anode, a sacrificial anode according to DIN EN 12828 made of magnesium alloy prevents unnoticed corrosion damage in water heaters. Defective areas in enamel or other passive protective coatings are subject to corrosion. This causes a flow of current which is transformed into a protective current by the anode material. The magnesium alloy anode material thus falls victim to electro-chemical corrosion. With signal anodes, whose rod materials are used up, water penetrates into the test space of the signal anode and a red discolouring occurs. With conventional anodes the boiler has to be opened up for anode inspection.

The outside of a signal anode shows its state of usage.

Since the protective function of the anode is not unlimited, consumed anodes have to be replaced. Signal anodes are primarily used instead of conventional sacrificial anodes in hot water storage tanks with a capacity of 100 to 500 litres. The magnesium anode is preferred in enamelled boilers but can also be used in hot water storage tanks with other types of passive protective coatings. If the signal anode is installed via G^{3/4}, G1, G1^{1/4} female connections or via M8 male, a more efficient way of checking boilers is achieved. Signal anodes are manufactured from magnesium alloy in accordance with the relevant

industry standards. The parts submerged in water are heat resistant up to operating temperatures of 100 °C, pressure-proof up to 15 bar system pressure and comply with the German Food Act. Various anode concepts are used:

Signal anode U

Universal and complete signal anodes with M8 male connection, screw fitting, with signal unit and instruction label. Length 500 mm, Ø 22 mm (G^{3/4}), 26 mm (G1), 33 mm (G1^{1/4}).

Anode I

Sacrificial anode Ø 26 mm for isolated installation, with M8 male connection, isolating piece and earth conductor. Consumption control with AT1 anode tester.

Sacrificial anode

With screw connection, without signal unit. This type is suitable for

all standard vessels. With various lengths, threads and diameters 22/26/33 mm.

Chain anode

Flexible anode with 4 individual elements along a stainless steel rope. With G^{3/4} screw connection, without signal unit, Length 800 mm. A chain anode is used when there is insufficient space to install a rigid anode.

Anode tester AT1

Tester for consumption control of isolated sacrificial anodes (see Anode I).

- Handheld tester with 4-level LED indication
- The actual state of an isolated installed anode is detected in a simple and time saving way
- Preventive maintenance - used anodes are replaced in good time

DG: G	PU	Part no.	Price €
Signal anode U22-3/4	10	69800	
Signal anode U26-1	10	69805	
Signal anode U33-1 1/4	10	69810	
Anode I 26-500-M8	10	69811	
Anode tester AT1	DG: H, PU 1	69842	
Sacrificial anode 22-500-3/4	10	69815	
Sacrificial anode 22-700-3/4	10	69817	
Sacrificial anode 26-500-1	10	69819	
Sacrificial anode 26-700-1	10	69821	
Sacrificial anode 33-550-1 1/4	10	69825	
Chain anode 22-800-3/4	10	69829	

Rain water harvesting – an ecological necessity



- 1** Rain Water System Centre RWSC
- 2** Level Indicator
- 3** Processed rain water pipework
- 4** Mains drinking water supply
- 5** Rain water suction pipe
- 6** Drinking water overflow
- 7** Tank filter with stainless steel sieve
- 8** Siphon
- 9** Floating suction fitting
- 10** Probe for minimum rain water level
- 11** Inlet unit for bottom filling
- 12** Plastic manhole cover for steel tank with inner lining
- 13** Rain water collection tank
- 14** Downpipe filter „Rainus“

A pressure controlled pump feeds the rain water through a special pipework system into the building's installation. If there is insufficient rain water, the exact amount required is drawn from the mains water supply. Rain water tanks can be installed in basements or underground in the garden. New installations normally use plastic or concrete tanks. However, it is also possible to convert existing tanks, cess-pit or old oil tanks. For the latter, AFRISO also supplies special customised plastic foil linings as well as manhole covers with all the required connections. The AFRISO rain water product range focuses on the measurement and control aspect as well as the provision of a complete range of installation accessories (see pages 140 to 149).

In addition, we supply special filter components with dirt collectors, activated carbon filters and UV disinfection (please enquire).

UV disinfection with dirt filters and activated carbon filters

**UV disinfection
with dirt filters
and activated
carbon filters**



Drinking water is our most important resource. On average, in Germany, each person consumes approx. 130 litres of drinking water each day, but only approx. 3 litres are actually used for drinking and preparing food.

There are a host of good reasons for harvesting rain water:

- Reserves of clean drinking water are limited.
- Drinking water is too valuable for watering the garden, washing clothes and flushing the toilet.
- Rain water harvesting helps to save energy (water treatment and transport).
- Rain water is lime-free

Benefits:

- Less detergent required
- Better for horticultural purposes
- Rain water tanks serve as intermediate retainers and only small quantities are discharged at a time into the mains drainage system.
- Even in dry summers, there is normally a sufficient supply of rain water.
- Several countries and regions subsidise rain water harvesting systems.
- Using rain water saves money and protects the environment.

The rain water from the roof area is fed through a filter system into the rain water collection tank.

Back-up controller for rain water harvesting systems



RENA back-up controller

This controller monitors rain water collection tanks for a sufficient level of rain water. If, as a result of insufficient precipitation or considerable water withdrawal, the level in the rain water tank falls below the low level sensor probe, fresh water from the mains water system is supplied to the rain water tank via a solenoid valve. The entire programme sequence is controlled by a microprocessor in the control unit. The controller is fitted with a power outlet socket for connecting the rain water system. The power to this socket is switched off when the water level in the rain water tank remains below the min. level probe. (Pump dry-run protection). A delay timer (2 selectable timer programmes) prevents excessive number of switching on/off operations of the solenoid valve and the controller. The back-up water volume drawn from the mains drinking water system is only the exact amount of water required. If the low level probe is not covered again by water after a period of time (determined by the programme) even though back-up mains water is supplied and no water is withdrawn from the system, the solenoid valve is closed because this suggests a possible leak in the supply pipe or in the rain water tank itself. (Safety shutdown)



In order to ensure proper and reliable operation of the solenoid valve in periods with much precipitation, the valve is automatically opened and closed again every week three times for one second. Controller and probe are interconnected by a signal cable with plugs. Standard length 10 m (25 m maximum). The solenoid valve is permanently connected to the controller by a 3-core power cable (length 3 m)

Scope of delivery

The complete back-up system consists of a controller, a solenoid valve (1/2 x 3/4) and a probe (10 m cable).

Technical specifications

Controller

Dimensions W x H x D:

97 x 163 x 62 mm

Weight: 0.5 kg

Supply voltage: AC 230 V 50 Hz

Power consumption: max. 5 VA

Mains fuse: M 32 mA

Safety power socket:

AC 230 V, max. 10 A, cos φ ≥ 0.9

Fuse: T 10 A

Operating temperature range:

Ambient: 0 °C to +40 °C

Protection class: II (DIN 57 700)

Protection: IP 20 (EN 60529)

Noise suppression:

According to EN 50081-1

Noise immunity:

According to EN 50082-1

Level probe

Supply voltage: AC 6 V

Probe current: 1.2 mA

Dimensions (Ø x L): 87 x 30 mm

Mounting:

By means of G1 screw fitting

Weight: 0.2 kg

Principle of operation:

Conductivity

Medium: Drinking and rain water

Solenoid valve

Space requirements (W x H x D):

95 x 80 x 100 mm

Weight: 0.5 kg

Supply voltage: AC 230 V 50 Hz

Power consumption: max. 5.5 VA

Connection cable: 3 m

Mounting position: Any

Medium: Drinking and rain water

Nominal pressure: 12 bar

Flow rate at 4 bar inlet pressure

and open outlet: approx. 50 l/min

Function: Closed when de-energised

Connection:

Inlet: G3/4 union nut with filter sieve/seal

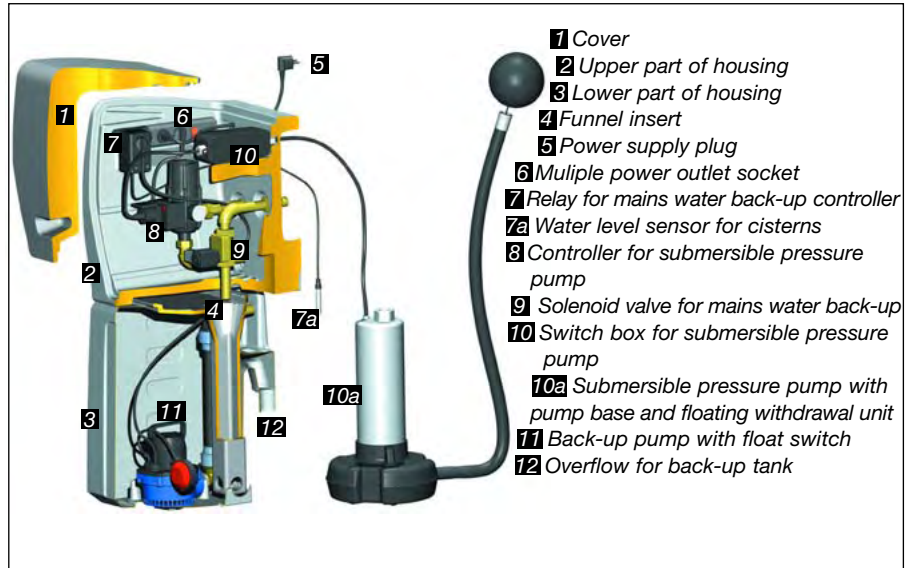
Outlet: G1/2 female thread

Protection class: I (DIN 57 700)

Protection: IP 65 (EN 60529)

DG: H	PU	Part no.	Price €
RENA back-up controller for rain water harvesting system, complete	1	53100	
RENA signal unit for back-up controller for rain water harvesting system	1	53101	
Level probe for RENA with 15 m cable	1	53102	
Level probe for RENA with 20 m cable	1	53121	
Level probe for RENA with 25 m cable	1	53122	
Solenoid valve 1/2 x 3/4	1	53134	

ReMax rain water system centre with pressure pump in the rain water tank



Fully automatic rain water system centre with submersible pressure pump in the rain water tank. Compact modular design for indoor installation. Fully equipped and ready for connection. Submersible pressure pump for installation in the rain water tank. The submersible pressure pump supplies the rain water from the rain water tank to the water system in the building. The pump is controlled by the pressure switch integrated in the ReMax system. If any tap is opened (e.g. in the garden), the pressure in the pipe drops. The pressure switch detects this pressure drop and starts the pump. When there is no longer a demand for water, the pump is automatically switched off.

If the rain tank is empty, a drinking water back-up system ensures continuous water supply. A sensor in the rain water tank detects the water level. If the level falls below the pre-set minimum, a relay operates and opens the solenoid valve. Drinking water now flows into the bottom tank of the ReMax centre in which a small submersible pump is located. This float-controlled submersible pump then feeds the drinking water into the rain water tank.

System advantages:

- The distance between the rain water tank and the building can be greater than for suction pump systems.
- Sound-proof plastic housing.

Technical specifications

Dimensions W x H x D:

42 x 105 x 51 cm

Compact ReMax centre, ready for connection:

- All connections with 3/4 male thread
- Connection cable 1.5 m
- Max. pumping pressure 4.4 bar
- Max. pumping volume 4.0 cbm/h
- Power consumption 800 W
- AC 230 V/50 Hz
- No commissioning required

ReMax connection kit

Flexible, armoured stainless steel hoses with G3/4 union nut, one end with elbow.

Hose length adapted to ReMax.



ReMax wall duct

For pipe or hole Ø 100 mm
2 x Ø 32 mm (brass elbows)
1 x Ø 16 mm
2 x cable ducts



ReMax label set

Consisting of:
Engraved plate
Adhesive tape
Section tape, length 10 m
Adhesive flag
Pipe marker



DG: M	PU	Part no.	Price €
ReMax	1	53095	
Connection kit	1	53096	
Wall duct	1	53097	
Label set	1	53098	

Rain water harvesting system centre RWSC



The AFRISO RWSC rain water system centre is a ready-to-connect compact central unit for rain water harvesting. RWSC can be used as a rain water control system with all standard water storage tanks. RWSC features a modular system design. The system also comprises the mains water back-up tank with an integrated mechanical float valve for a reliable water supply.

The microprocessor controlled RWSC system centre controls the entire sequence of functions and ensures reliable performance. The display provides information on the actual state of operation.

RWSC primarily uses rain water from the rain water storage tank. If the sensor detects that there is no rain water available, the three-way valve switches over to mains water back-up and RWSC supplies drinking water from the drinking water back-up tank.

A short rain shower is sufficient for RWSC to switch back to rain water mode.

The integrated pneumatic tank contents gauge with analogue indication displays the level in the rain water storage tank. Upon request, we install a hydrostatic measuring system with digital display. The pump, the processor units and the other function components are arranged on top of the mains water back-up tank in a compact way – ready to be plugged in.

If there is a danger of backwash from the sewage system, RWSC can be equipped with a backwash control.

In addition, it is possible to connect an alarm unit which generates audible and visual alarm signals when there is a problem with the mechanical float valve of the mains water back-up system.

The modular RWSC rain water system centre is easy to service as all electrical connections are of a plug-in design.

RWSC ensures that expensive drinking water is used very sparingly, thereby contributing to quick amortisation of the system cost.

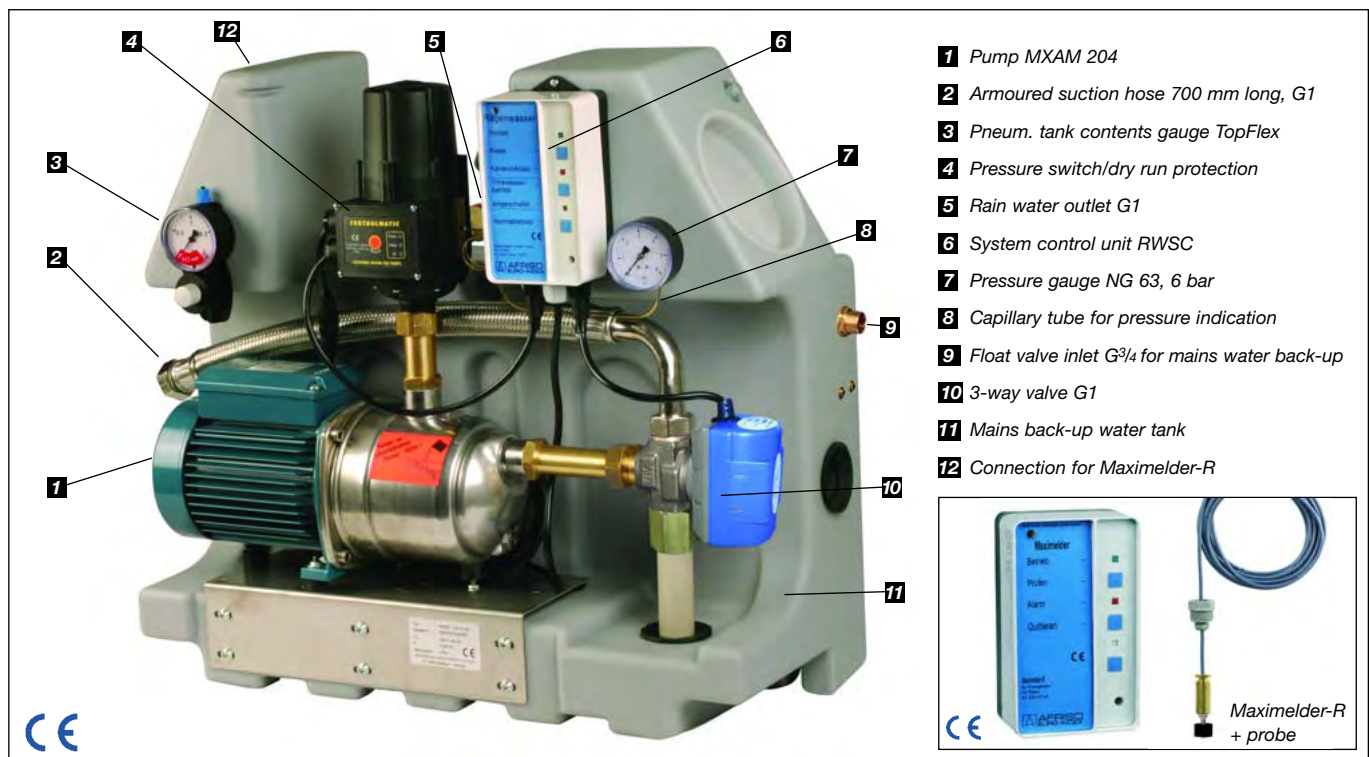
Scope of delivery

RWSC rain water system centre complete, including pneumatic tank contents gauge with capillary, one flexible, armoured suction hose, two flexible, armoured pressure hoses, one MIN level probe with cable, 2 HT elbows 87° DN 50 for emergency overflow and one emergency overflow funnel, fixing kit, installation and operating instructions.

Please refer to page 143 for technical specifications.

DG: M	PU	Part no.	Price €
RWSC Motor 550 W 4.0 bar	1	53106	

RWSC spare parts and accessories



The RWSC rain water system centre consists of individual system modules. All modules are electrically interconnected by plug-in connections and mechanically by union nuts with flat gaskets. This ensures quick and easy servicing or replacement of individual modules. An optional probe for detection of backwash from the sewage system can be connected to the system. RWSC is also laid out for the connection of a maximum level alarm unit which provides audible and visual alarm signals when a problem occurs with the float valve for the mains

back-up water supply. Please order the backwash probe and associated level alarm unit separately. It is also possible to install the DIT 02 digital level indicator in lieu of the TopFlex pneumatic tank contents gauge at an additional cost.

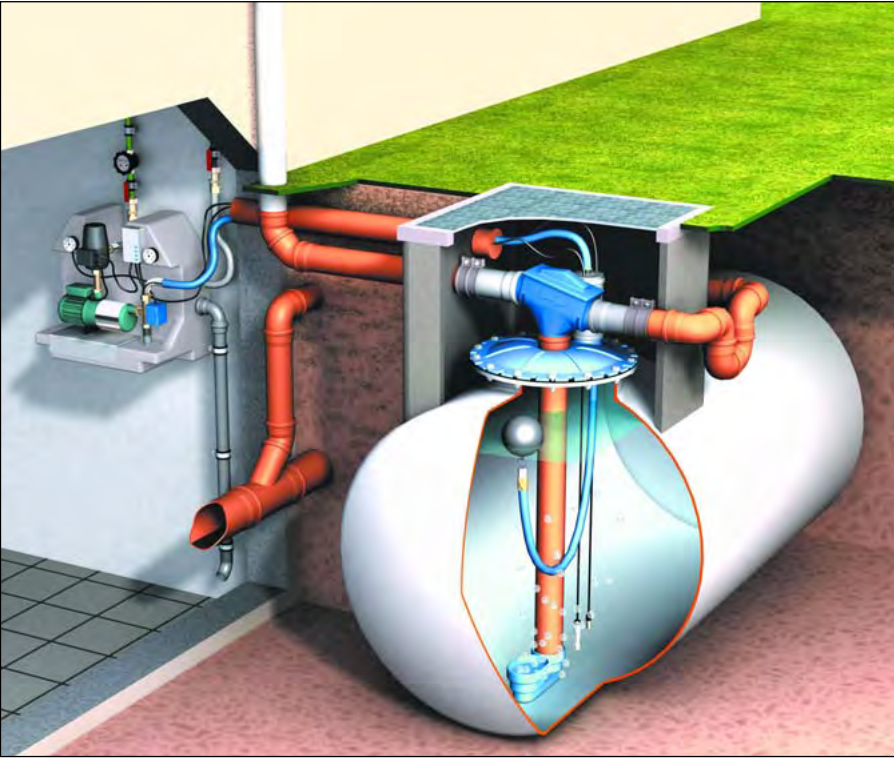
Technical specifications RWSC:

Dimensions (W x H x D):
650 x 600 x 300 mm
Weight (without water): ~27.5 kg
Weight (with water): ~45 kg
Max. water volume in the tank: 18 litres
Operating temperature range

Medium: 4 °C/35 °C
Ambient: 4 °C/40 °C
Supply voltage: AC 230 V/50 Hz
Max. power consumption: 1,500 VA
Max. motor power: 550 W
Max. pump head: 40 m
Max. pressure: 4.0 bar
Max. pumping volume: 4,500 l/h
Max. suction height: 8 m
Max. suction distance: 15 m
Emergency overflow: DN 50
Protection class: I (EN 60335-1)
Protection: IP42 (EN 60529)
Electr. safety: According to EN 60335-1

	DG	Part no.	PU	Price €
1 Pump MXAM 204 without screw connections	M	22 03 02 10	1	
2 Armoured suction hose 700 mm long, G1 f/f	M	820 000 0033	1	
3 Pneumatic tank contents gauge TopFlex (or DIT 02 optional)	M	28032	1	
Digital level indicator DIT 02 (refer to page 20)	H	52124	1	
4 Pressure switch/dry run protection	M	04 00 000002	1	
5 Armoured pressure hose 600 mm long, G1 f/f (not shown)	M	820 000 0034	1	
Armoured pressure hose 200 mm long, G3/4 f/f (not shown)	M	820 000 0035	1	
6 System control unit RWSC	M	04 00 00 09	1	
7 Pressure gauge NG 63, 6 bar	G	63538	1	
8 Connection piece with capillary tube	M	04 00 00 08	1	
9 Float valve for mains water back-up supply	M	05 00 350103	1	
Styrofoam float for float valve	M	04 00 000023	1	
10 3-way valve	M	04 00 00 14	1	
11 Mains back-up water tank	M	04 00 000003	1	
12 Maximelder-R	G	16702	1	
Probe for backwash alarm with 16.5 m cable (not shown)	M	16713	1	
Capillary tube 4 x 1 mm, 16.5 m, PE black (not shown)	M	20358	1	

Oil tank conversion kit I for rain water usage in the house and the garden



If heating oil storage tanks can no longer be used, for example due to corrosion, or if the heating system is converted to other types of fuel, it may be a good idea to use the existing tank to collect rain water and to integrate it into a rain water harvesting system. For this purpose, the tank is cleaned by a specialist company and then fitted with a suitable inner lining (refer to page 80). The old, standardised manhole cover (Ø 500 mm) is replaced by a plastic cover which is specially designed for rain water systems. This considerably facilitates the conversion. The manhole cover contains all the required connections (filter, inlet, suction pipe and level probes).

- Conversion kit I contains:
- Rain water harvesting system centre RWSC
 - Plastic manhole cover Ø 500 mm with two connections for pipes Ø 100 mm
 - Cartridge filter for direct mounting to the manhole cover. Connections for inlet and outlet pipes Ø 100 mm. Suitable for roof areas of up to 150 m². Height offset inlet - outlet 60 mm.
 - 2 quick-action connection pieces for the inlet and outlet pipes.
 - Floating suction fitting with 215 cm long suction hose.
 - Inlet unit for bottom filling.
 - Wall duct Ø 100 mm for suction pipe and level probes. Please order the inner lining separately (refer to page 80).

Scope of delivery

Rain water harvesting system centre RWSC



Plastic manhole cover Ø 500 mm



Cartridge filter



Quick-action connection pieces



Floating suction fitting with flexible suction hose



Inlet unit for bottom filling

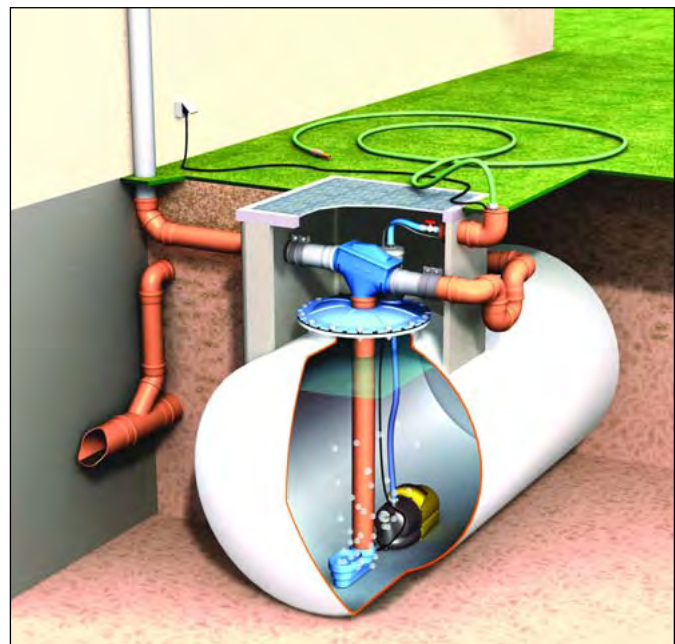
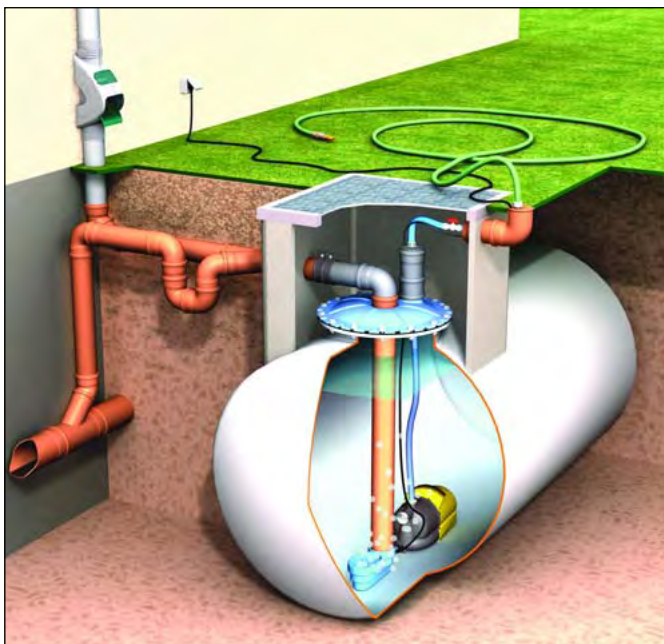


Wall duct



DG: M	PU	Part no.	Price €
Oil tank conversion kit I	1	53075	
Plastic manhole cover Ø 500 mm	1	53099	

Oil tank conversation kits II + III for rain water usage in the garden



Oil tank conversion made easy!
We supply a number of individually manufactured special rain water components for quick and easy installation. The tank cover is the most important component of the kit as it enables simple and clean piping through two openings. The pipe is routed from the downpipe to the access chamber of the tank and then connected to the relevant filter system.

Depending on site conditions and available space in the access chamber, it is recommended to install a downpipe filter or a cartridge filter. Quick-action connectors are used to connect the filter elements. The pipe to the sewage system must be constructed to form a siphon using the drain pipe elbows. The Forta Duo 1100 submersible pressure pump with integrated pressure switch is ideally suited for water withdrawal.

Scope of delivery oil tank conversion kit II (up to 75 sqm roof area):

Rainus downpipe filter
with 2 quick-action
connection
pieces



Plastic manhole cover Ø 500 mm



Inlet unit for bottom filling



Scope of delivery oil tank conversion kit III (up to 150 sqm roof area):

Cartridge filter with
2 quick-action
connection
pieces



Plastic manhole cover Ø 500 mm



Inlet unit for bottom filling



Refer to page 80 for inner linings
for tanks.
Refer to pages 15 and 20 for level
measurement.

DG: M	PU	Part no.	Price €
Oil tank conversion kit II	1	53076	
Oil tank conversion kit III	1	53077	
Pump Forta Duo 1100 for conversion kits II and III	1	53078	

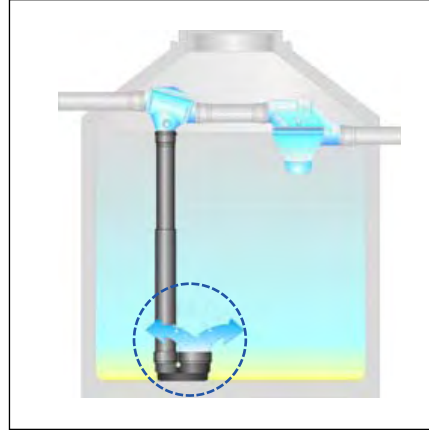
Cleaning principle for rain water harvesting

new



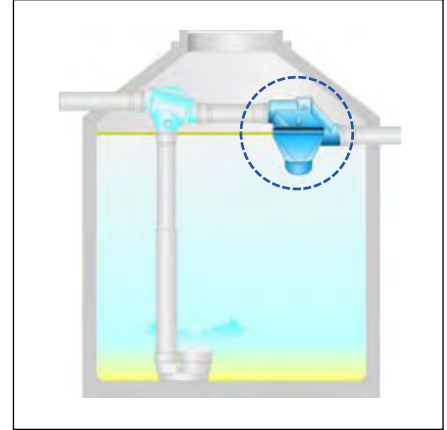
Cleaning stage 1

The filter is the first cleaning stage of the system. The water flows from the roof through the filter which then removes the dirt from the water. The cleaned water is fed to the collection tank and the dirt is either flushed into the sewage system along with a small amount of the rain water or it is ejected or retained in a basket. Various principles of operation and connection possibilities provide for applications in a great variety of installations.



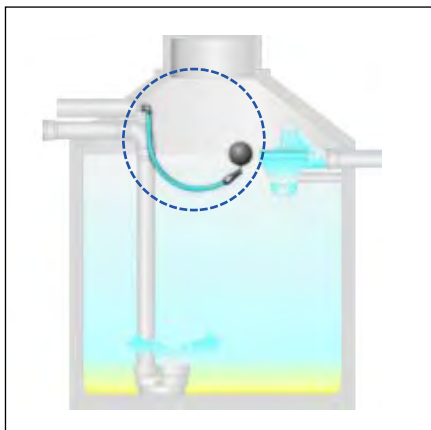
Cleaning stage 2

The inlet unit for bottom filling prevents turbulence in the tank during filling. Sedimentation of fine particles on the bottom of the tank is improved and sedimentation layers are not stirred up. At the same time, lower water layers in the tank are also supplied with oxygen, which in turn prevents anaerobic processes to take place. The water remains fresh!



Cleaning stage 3

Particles that are lighter than water (e.g. pollen) slowly rise and float on the surface. This floating layer is removed from the tank through a specially formed overflow siphon when the cistern overflows. Regular overflows are important for a continuous, high water quality in the tank and to stop the water from „fouling“. The floating layer could become so thick that it could prevent oxygen from getting into the water.



Cleaning stage 4

The rain water should not be withdrawn from the lowest point in the tank as this could disturb the sedimentation layer. Therefore, it is recommended that water is withdrawn from a higher level in the tank.



Rain water filters



VF 1 volume filter with telescopic extension (for rain water)

For roof areas of up to 350 sqm. Preferably for underground installation. Height offset between inlet and outlet to the sewage system 300 mm. Due to the dual-stage filtering principle (coarse filtering first, then fine filtering), the VF 1 volume filter requires very little maintenance. Dirt is directly flushed into the sewage system by the rain water. 85 to 95 % of the rain water is cleaned and fed to the rain water storage tank.

The housing is made from high grade polyethylene, the filter insert from stainless steel. The filter is easy to clean and, therefore, need not be replaced. An optional telescopic head-piece extension allows the filter cover to be set level with the ground (250 mm to 750 mm). Please order the extension separately.

SF sinus filter

Rain water filter for fitting to the storage tank or the dome shaft of the storage tank. For roof areas of up to 150 sqm, without height offset. Optional backwash kit for easy cleaning.



Backwash kit

For easy cleaning of sinus and cartridge filter inserts. Approved for connection to only one rain water tapping point. The kit consists of special nozzles, 10 m PE pipe and corresponding screw connections.

PF cartridge filter

Rain water filter for fitting to in the storage tank or the dome shaft of the storage tank. For roof areas of up to 150 sqm, height offset 66 mm. Optional backwash kit for easy cleaning.



Backwash kit with automatic flushing

For automatic filter cleaning. Battery operated.

DG: M	PU	Part no.	Price €
VF 1 volume filter	1	53088	
Telescopic extension	1	53089	
SF sinus filter	1	53090	
PF cartridge filter	1	53091	
Backwash kit	1	53092	
Backwash kit with automatic flushing	1	53093	

Rain water downpipe filters



Rainus

Downpipe filter for roof areas of up to 75 sqm with stainless steel filter sieve. The dirt is ejected to the front, the cleaned rain water continues to flow through the downpipe. Therefore, Rainus is ideally suited for retrofitting to existing storage tanks or as a pre-filter for insufficiently equipped rain water systems. Suitable for downpipe Ø 100 and optionally for downpipe Ø 80 and 110 mm.

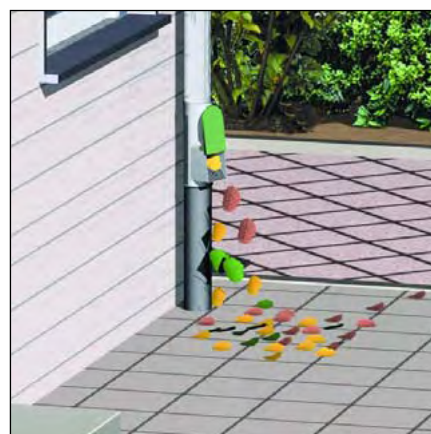
Ideal:

- For seepage
- For retrofitting
- As a pond filter



Downpipe filter FF

For roof areas of up to 150 sqm, for pipe Ø 100 mm. Filters and collects the rain water for rain barrels and cisterns. The filter insert can be easily and quickly removed for cleaning. Available in copper or zinc.



Leaf filter

For roof areas of up to 80 sqm, for pipe Ø 100 mm for coarse filtering of the rain water. Leaves and similar debris are ejected out of the filter front. Adapter for pipe Ø 80 mm included.

DG: M	PU	Part no.	Price €
Rainus	1	53081	
Downpipe filter FF copper, DN 100	1	53082	
Reducer set copper, DN 80	1	53083	
Downpipe filter FF zinc, DN 100	1	53084	
Reducer set zinc, DN 80	1	53085	
Leaf filter, grey	1	53086	
Leaf filter, brown	1	53087	

Accessories for rain water harvesting



Overflow siphon

Made from high grade PE, for tank overflow, with stench trap, rodent stop and connection for backwash alarm. Connection DN 100. With connection piece for support pipe.



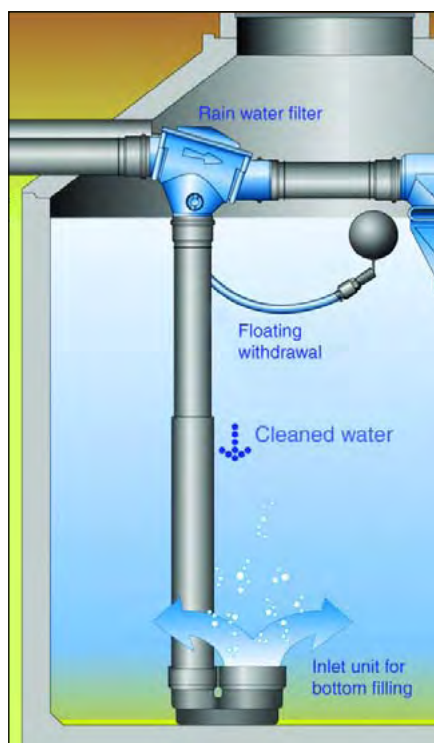
Floating suction fitting

For the withdrawal of rain water from the storage tank. The floating ball ensures that the water is always withdrawn from the cleanest layer. With non-return valve, dirt collector and hose connection.



Inlet unit for bottom filling

Ensures the non-turbulent supply of rain water to the collection tank and prevents sediments from being stirred up. Suitable for pipes with Ø 100 and Ø 125 mm.



Flexible suction hose

Ø 36 mm, for 1" connections (e.g. floating suction fitting). Please specify length when ordering.



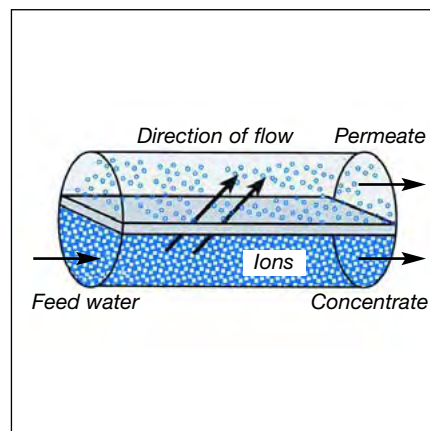
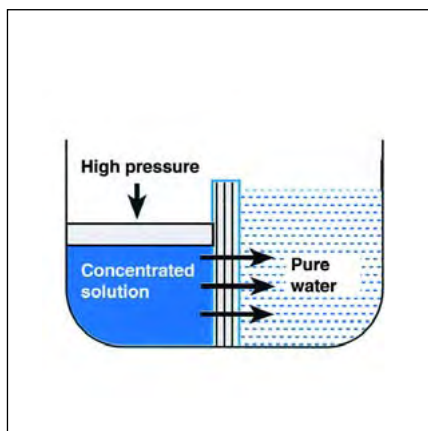
Quick-action connection pieces

For simple mounting of filters in tanks and pipes Ø 100 mm.

DG: M	PU	Part no.	Price €
Overflow siphon with rodent stop	1	53113	
Floating suction fitting	1	53153	
Inlet unit for bottom filling	1	53111	
Flexible suction hose per metre	1	53079	
Quick-action connection pieces for DN 100	1	53080	

Water treatment systems with reverse osmosis

The environmentally friendly and economical process for demineralising water



Application areas

Reverse osmosis systems are used in all applications requiring a continuous supply of pure water produced in an economic way.

Typical application areas comprise:

- Drinking and process water treatment from well water
- Removal of nitrates from drinking water
- Food and beverage industries
- Manufacturing of electronics components/semiconductors
- Electroplating industry
- Cosmetics industry
- Steam generation, heating system
- Sea water desalination
- Laundry for ultra-clean rooms

AFRISO designs and produces customised water treatment systems to meet your specific requirements. Please enquire.

What is osmosis?

Osmosis, a natural process, is the tendency of a solvent to pass from a less concentrated into a more concentrated solution through a semipermeable membrane.

This process continues until the pressure of the more concentrated solution exceeds that of the less concentrated.

Due to the size of their ions, dissolved salts cannot pass through the membrane.

Almost all natural metabolic processes are based on the principle of osmosis.

What is reverse osmosis?

When pressure is applied to the concentrated solution, the direction of flow through the membrane (referred to as a module in reverse osmosis systems) is reversed.

The raw water is first physically cleaned by passing through a fine filter and then pumped using a high pressure pump.

The specific properties of the membrane surface retain any substances in the water. These substances are discharged with

the concentrate whilst the permeate (chemically, physically and bacteriologically pure water) passes the module.

The recovery level (percentage of pure water) is adjustable. It depends on the type and size of the module, the concentration and composition of minerals in the raw water as well as the required quality of the permeate.

How do the membranes work?

Reverse osmosis water treatment facilities use synthetic, spiral-wound membranes.

Water molecules can pass through these membranes. Substances dissolved in the water are retained. The concentrated solution (e.g. drinking water or process water) passes this membrane at high pressure.

The solution is now separated into two partial flows: one with pure water (permeate), the other with water which contains retained substances (concentrate).

Chapter 9

Table of contents chapter 9

Heating controllers, thermostats, solar controllers

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Differential temperature controllers for solar collectors	157-158



09



Outdoor temperature compensated heating control equipment

Outdoor temperature compensated heating controller AFRISO-Control K1 series



SM 40 actuator



FBR1 remote control with room sensor



Application

Outdoor temperature compensated controls are the most comfortable and energy efficient type of heating controls. If the controllers are properly adapted to the heating system, they ensure optimum room temperature stability. Outdoor temperature compensated heating controllers should always be used for underfloor heating systems.

Description

Outdoor temperature compensated heating controllers compare all incoming measurements with the pre-set and calculated setpoints to ensure optimum interaction of all individual heating system components. Based on these optimised values, the burner or the circulation pump is switched on or off and the mixer motor opened or closed as required. The result is a constant indoor temperature which is completely independent of the outdoor weather conditions. To drive mixers, the AFRISO-Control units use an external actuator. The Compact-Control units are mounted directly on to the mixer using a mounting kit. The optional FBR1 remote control with integrated room sensor can be used for all Control and Compact-Control devices. FBR1 allows the user to conveniently change the room temperature by up to $\pm 5^\circ\text{C}$.

Basic functions of all heating controllers

- Outdoor and indoor temperature compensated control
- Demand-dependent switching of the circulation pump
- Automatic function adaptation to the sensor configuration

Basic features of all heating controllers

- Function indicators on the controller
- Controls for all adjustment possibilities on the unit
- The room temperature setpoint can also be adjusted using the optional FBR1 remote control

AFRISO-Control K1 series

Suitable for retrofitting to existing installations with 1 heating circuit and a hot water circuit. Boiler temperature control is achieved by switching the burner on/off depending on outdoor temperatures. Adjustable boiler start-up relief temperature. Dynamic switching hysteresis for the burner. Three point output for supply temperature control with mixer **or** dual point output for boiler and hot water temperature control with burner control. Choice of hot water priority or parallel operation. Frost protected $> 3^\circ\text{C}$. Mixer driven by external actuator SM 40 or SM 70.

AFRISO-Control E8 series

For outdoor temperature compensated boiler, mixer circuit and hot water control. 1 outdoor sensor for up to 6 controllers. Backlit display with plain text indication for all parameters in several languages. Simple single knob adjustment. Clearly structured menu guide for easy programming. Numerous functions such as test, holiday, air conditioning, timemaster, anti-legionellae function, frost protection and screed type floor functions. Indication of maintenance intervals, running up/down temperature optimisation. With EEPROM check, pump and mixer blocking protection. Mixer driven by external actuator SM 40 or SM 70.

AFRISO-Control E25 series

Indoor/outdoor temperature compensated controller for 2 heating circuits and a hot water circuit. Automatic boiler start-up relief. Minimum temperature limit for boiler. Dynamic hysteresis to improve burner runtime and to reduce the number of burner starts. Choice of hot water control in parallel or priority mode. Integrated sensor monitoring. Minimum boiler temperature. Pump follow-on run after burner is switched off. Two FBR1 remote controls with integrated room sensors can be connected. Mixer driven by external actuator SM 40 or SM 70.

Outdoor temperature compensated heating control equipment

Outdoor temperature compensated heating controller AFRISO-Control K1 series



AFRISO-Control K1 series

Outdoor temperature compensated digital heating controller K1 in 2 versions (analogue or digital timer) with analogue operation, for wall mounting. Supplied with outdoor sensor AFS and surface mounting sensor VFAS. Sensor system: 1kOhm PTC sensor.

AFRISO-Control HQN 2/K1 Analogue

Heating controller K1 with quartz timer. The day/night programme with power reserve (at least 50 hours) is adjustable as a single-channel heating programme. Can be used as boiler controller, as boiler hot water control or to drive a motor-adjustable mixer for a heating circuit.

AFRISO-Control HDN 3/K1 Digital

Heating controller K1 with digital timer. Day/night programme with power reserve (at least 50 hours) is separately adjustable as a dual channel heating programme for heating and hot water. Various modes, e.g. holiday mode. Other functions are similar to those of HQN 2/K1 Analogue (see above).

Remote control FBR1

With integrated room sensor. With rotary switch (heating, timer, reduced temperature) and rotary knob for adjusting the room temperature setpoint by $\pm 5^{\circ}\text{C}$ (relative to normal operational mode).

Outdoor temperature compensated heating controller AFRISO-Control E8 series



AFRISO-Control E8 series

Outdoor temperature compensated heating controller E8 in 3 versions for mounting to boiler. With interfaces for CAN bus and PC (optical). Compatible in case of replacement of devices. Inputs can be switched to suit 1 kOhm PTC sensor or 5 kOhm NTC sensor.

AFRISO-Control E8.0231

Suitable for single circuit heating systems with single or dual stage burners with or without hot water control. Supply temperature controlled by switching on/off burner and heating pump.

AFRISO-Control E8.0321

Suitable for controlling heating systems with 2 separate heating circuits. The two supply temperatures are controlled independently: Heating circuit 1 (direct circuit) by switching the burner and the circulation pump, circuit 2 via a motor-adjustable mixer.

AFRISO-Control E8.0631

Suitable for controlling systems with dual-stage burners or with 2 boilers. In addition, 2 heating circuits can be controlled by motor-adjustable mixers. Both heating circuits have their own timer programmes and can be controlled separately via two FBR1 remote controls.

Outdoor temperature compensated heating controller AFRISO-Control E25 series



AFRISO-Control E25 series

Outdoor temperature compensated digital heating controller E25 in 2 versions with analogue operation. For wall mounting and installation in control panels and boilers. Supplied with 1 sensor AFS and 2 sensors VFAS. Sensor system: 1 kOhm PTC sensor.

AFRISO-Control E25.0300-Analogue

Heating controller E25 with analogue timer. For single-stage burner control, one mixer circuit and hot water control. Control of heating circuit 1 by switching the burner, control of heating circuit 2 by motor-adjustable mixer. Hot water control by switching the pump.

AFRISO-Control E25.0300-Digital

Heating controller E25 with dual channel digital timer with weekly programme. Choice of assignment of the timer channels, room sensor setting can be adjusted separately for each heating circuit if FBR1 remote control is used. Other functions are similar to those of E25.0300 Analogue (see above).

Programmable thermostat COMO Room temperature controller

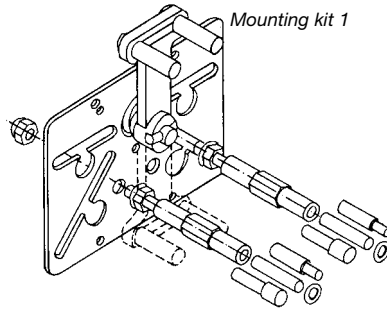
Simple operation due to plain text display, heating or AC mode, weekly timer, max. 3 heating periods per day, Party and ECO buttons, holiday programme. Frost protection, battery operated.

Outdoor temperature compensated heating control equipment

AFRISO-Compact-Control U2/ME 80 Analogue



Mounting kits for AFRISO-Compact-Control U2/ME 80 Analogue and U3/ME 80 Digital for virtually any standard mixer



Mounting kit 1: AEG, Buderus, Loell, Kiebak & Peter, Landis & Gyr, Bico, Honeywell, LMT (Amix) Mühlenberg, Viessmann (Nw 32-65), Klöckner, Holter, R u. S, Büche, L u. G, Serseg, Jasfa, Wita.

Mounting kit 5: Billmann (France), Krona (three and four way), Ondal, Elesta, Olymp, ESBE, PAW, L+S, Wilo

Mounting kit 9: Zentra -new, ZR and DR, Vaillant VRM 3 + 4

Mounting kit 11: Centra DRU

AFRISO-Compact-Control series

Outdoor temperature compensated, digital heating controller Compact-Control U2/ME 80, compact design (2 versions). With surface mounted supply line sensor and outdoor sensor. With removable transmission lever. For direct mounting to virtually any standard flange or threaded mixer using mounting kits (see above, mounting kits must be ordered separately).

AFRISO-Compact-Control U2/ME 80 Analogue

Equipped with analogue 24h quartz timer with power reserve. (Day/night programme).

AFRISO-Compact-Control U3/ME 80 Digital

Similar to Compact-Control U2/ME 80 Analogue, but with digital weekly timer.

Actuator SM 40

For small mixers. Direct mounting to the mixer using a suitable adaptor (refer to table on the right for adaptors for SM 40).

Actuator SM 70

For standard mixers. Direct mounting to the mixer using a mounting kit. (Refer to table on the right for mounting kits for SM 70 and Compact-Control)

DG: G	PU	Part no.	Price €
AFRISO-Control HQN 2/K1 Analogue	1	69306	
AFRISO-Control HDN 3/K1 Digital	1	69307	
AFRISO-Control E8.0231 Digital	1	69319	
Terminal kit for E8.0231	1	69330	
AFRISO-Control E8.0321 Digital	1	69320	
Terminal kit for E8.0321		69331	
AFRISO-Control E8.0631 Digital	1	69329	
Terminal kit for E8.0631		69331	
AFRISO-Control E25.0300 Analogue	1	69321	
AFRISO-Control E25.0300 Digital	1	69322	
Programmable thermostat COMO	1	69323	
AFRISO-Compact-Control U2/ME 80 Analogue	1	69297	
AFRISO-Compact-Control U3/ME 80 Digital	1	69298	
Actuator SM 40 for small mixers	1	69311	
Actuator SM 70 for standard mixers	1	69324	
Remote control FBR1	1	69308	
Surface mounted sensor VFAS, 1 kOhm	1	69305	
Storage tank sensor SPFS, 1 kOhm	1	69309	
Outdoor sensor AFS, 1 kOhm	1	69249	
Surface mounted sensor VF, 5 kOhm	1	69325	
Storage tank sensor SPF, 5 kOhm	1	69326	
Adaptors for SM 40 actuator:			
Kromschroder, WITA, H-Mixer	1	69311KR	
ESBE, Thermomix	1	69311ES	
Holter Compact	1	69311HC	
L&S	1	69311LS	
Honeywell, Pommerening	1	69311HW	
Mounting kits for SM 70 actuator and AFRISO-Compact-Control:			
Mounting kit 1	1	69261	
Mounting kit 5	1	69265	
Mounting kit 9	1	69269	
Mounting kit 11	1	69273	

Outdoor temperature compensated heating control equipment

Summary of heating controllers

Features of heating controllers, temperature sensors and remote control											
Heating controllers with timers	Z: Burner ON/OFF (2-point control)	K: Dual-stage burner or 2 individual burners	M: Mixer 1 connection as per plan	M: Mixer 2 connection as per plan	W: Hot water temperature timer-controlled	Outdoor wall sensor AFS	Hot water temperature controlled, use SPFS	Supply sensor KFS/VFAS used as boiler sensor KFS	Supply sensor VFAS in mixer circuit	Remote control FBR1 for temperature adjustment	
AFRISO-Control HQN 2/K1 analogue timer	●	---	●	---	●	●	●	●	●	●	
AFRISO-Control HDN 3/K1 digital timer	●	---	●	---	●	●	●	●	●	●	
AFRISO-Control E8.0231 digital timer with LCD display	●	●	---	---	●	●	●	●	---	●	
AFRISO-Control E8.0321 digital timer with LCD display	●	---	●	---	●	●	●	●	●	●	
AFRISO-Control E8.0631 digital timer with LCD display	●	●	●	●	●	●	●	●	●	●	
AFRISO-Control E25.0300 analogue timer	●	---	●	---	●	●	●	●	●	●	
AFRISO-Control E25.0300 digital timer	●	---	●	---	●	●	●	●	●	●	
AFRISO-Compact-Control U2/ME 80 analogue timer	---	---	●	---	●	●	---	---	●	●	
AFRISO-Compact-Control U3/ME 80 digital timer	---	---	●	---	●	●	---	---	●	●	
Programmable thermostat COMO	●	---	---	---	---	---	---	---	---	---	

Legend: ● = yes/works/is fulfilled/can be connected ● = is included in scope of delivery

Technical specifications of heating controllers and actuators

Series/type	K1	E8	E25	ME80	COMO	SM 40	SM 70
Technical specifications							
Room temperature	12 °C-28 °C	12 °C-28 °C	12 °C-28 °C	12 °C-28 °C	12 °C-28 °C	---	---
Hot water temperature	10 °C-60 °C	10 °C-60 °C	10 °C-60 °C	10 °C-60 °C	10 °C-60 °C	---	---
Minimum temperature	10 °C-60 °C	10 °C-60 °C	10 °C-60 °C	10 °C-60 °C	10 °C-60 °C	---	---
Night reduction temperature	4 °C-20 °C	4 °C-20 °C	4 °C-20 °C	4 °C-20 °C	4 °C-20 °C	---	---
Boiler start-up relief	1 °C-50 °C	1 °C-50 °C	1 °C-50 °C	1 °C-50 °C	---	---	---
Ambient temperature	0 °C-50 °C	0 °C-50 °C	0 °C-50 °C	0 °C- 5 °C	0 °C-50 °C	---	---
Automatic summer/winter switching	●	●	●	●	---	---	---
Heating curve	0.2-3	0-3	0.2-3	0.2-3	---	---	---
Running time in seconds for ° angle	---	---	---	130 s/90°	---	150 s/90°	130 s/90°
Setting angle (15° increments from 15° to 345°)	---	---	---	88°-85°	---	90°	88°-85°
Torque	---	---	---	10 Nm	---	6 Nm	10 Nm
Housing	Plastic	Plastic	Plastic	Plastic	Plastic	Plastic	Plastic
Dimensions of housing (H x W)	94 x 140 mm	---	---	94 x 140 mm	96 x 144 mm	---	---
Dimensions panel mounting (H x W)	---	92 x 138 mm	92 x 138 mm	---	---	---	---
Supply voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V	2 x 1,5 V Batt.	AC 230 V	AC 230 V
Power consumption	5 VA	8 VA	5 VA	5 VA	Batt.: ≥ 1 J.	1.3 VA	3.5 VA
Relay output	250V, 2(2) A	250V, 2(2) A	250V, 2(2) A	250V, 2(2) A	250V, 2(2) A	---	---
Protection	IP 40 (EN 60529)	IP 40 (EN 60529)	IP 40 (EN 60529)	IP 40 (EN 60529)	IP 40 (EN 60529)	IP 41 (EN 60730)	IP 41 (EN 60730)
Protection class (EN 60730)	II	II	II	I	III	I	I

Programmable thermostats, room thermostats



Ibis B1

Electronic thermostat with digital clock, battery operated, with day programme. Programmable in segments of 30 minutes, night reduction adjustable from +2 °C/ +10 °C.



Colibri 11

Room thermostat with liquid-filled capsule measuring element, with voltage-free changeover contact.



Colibri 12

Similar to 11, but with indicator lamp for heating mode.



Albatros B1

Electronic thermostat with analogue clock, voltage-free changeover contact, indicator lamp and selector switch: Frost protection/day/night/timer. Quartz timer with day programme, programmable in segments of 15 minutes. Day and night temperatures can be adjusted separately between +5 °C and +30 °C. Battery operated.



Colibri 13

Similar to Colibri 12, but with ON/OFF switch.



Colibri 14

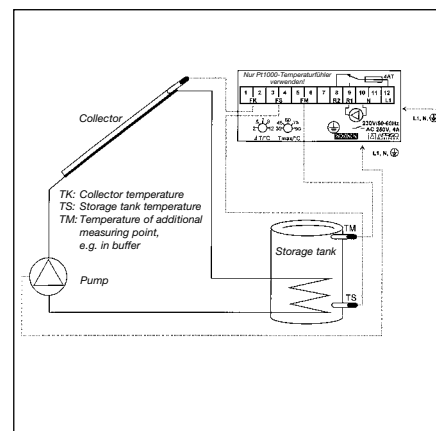
Similar to Colibri 12, but with selector switch for summer/winter (AC/heating).

DG: G	PU	Part no.	Price €
Ibis B1	5	42656	
Albatros B1	5	42647	
Colibri 11	10	42630	
Colibri 12	10	42631	
Colibri 13	10	42639	
Colibri 14	10	42632	

	Ibis B 1	Albatros B1	Colibri 11	Colibri 12	Colibri 13	Colibri 14												
Room thermostat	x	x	x	x	x	x												
Supply voltage	DC 3V	DC 3V	AC 230V	AC 230V	AC 230V	AC 230V												
Wiring	2	2/3	2	3	3	3												
Control range (°C)	10-30	5-30	5-30	5-30	5-30	5-30												
Switching differential (K)	<0,5	0,3	<0,7	<0,7	<0,7	<0,7												
Frost protection setting (°C)	6	5	5	5	5	5												
Automatic frost protection	yes	yes	yes	yes	no	no												
Indicator lamp	x	-	-	x	x	x												
Switch	T/N/ U	OT/ N/U	-	-	ON/ OFF	SW												
Switch rating (AC 250 V)	10 (2)A	8 (2)A	10 (2)A	10 (2)A	10 (2)A	10 (2)A												
Timer	x	x	-	-	-	-												
Switching programme	Day	Day	-	-	-	-												
Ambient temperature (°C)	0-50	0-50	0-50	0-50	0-50	0-50												
Protection	IP30	IP30	IP30	IP30	IP30	IP30												
Dimensions (mm)	145x 90x35	145x 85x45	80x 80x40	80x 80x40	80x 80x40	80x 80x40												
Standard colour	white	white	white	white	white	white												

Differential temperature controllers for solar collectors

Solar controller SR1



Solar controller SR1

Designed for manual or automatic control of solar systems for water heaters with one hot water circuit.

In automatic mode, the pump is switched on when the temperature difference between the collector and the storage tank has reached the adjustable value ΔT . If ΔT is below the set value or if the maximum tank temperature T_{max} (adjustable) is reached, the pump is switched off and there is no further charging.

The digital display of the solar controller displays one of three selectable temperatures. The solar controller consists of a control unit and a maximum of 3 temperature probes (2 probes are supplied with the system). The control unit and the probes are connected by two-core signal cables (maximum length 50 m). Two probes detect the temperatures necessary to control the collector (TK) and the storage tank (TS). A third probe can be connected to display the temperature of an additional measuring point (TM) (e.g. buffer tank).

However, the latter has no influence on the control functions. The control unit evaluates the probe signals and switches the pump relay, depending on the adjustable parameters „temperature differential ΔT “ and „maximum storage tank temperature T_{max} “.

Operating mode is selected using the operating mode selector switch with the following settings:

- 0** Pump off
- Auto** Automatic pump control depending on collector and storage tank temperatures
- 1** Pump on

Technical specifications

Control unit:

Dimensions W x H x D:

113 x 53 x 108 mm

Weight: 0.4 kg

Supply voltage: AC 230 V

Power consumption: 4 VA

Measuring range:

-19.9 °C/+149.9 °C

Accuracy of measurement: ± 1 % FS

Probe supply: 5 V, $R_i = 1$ k Ω

Probe type: Pt 1000

Output relay:

Changeover contact, max. 250 V, 3 A

On/off time delay in automatic mode: approx. 15 s

Display:

7-segment LED, 3 digits,

-9.9 °C/+99.9 °C: resolution 0.1 °C

Switch points:

• **Temperature difference ΔT :**

Range +2 °C/+12 °C, adjustable, on/off switching hysteresis: 1.5 °C

• **Storage tank max. temperature T_{max} :**

Range +30 °C/+90 °C, On/off switching hysteresis: 2 °C

• **Collector max. temperature:**

140 °C, on/off switching hysteresis: 2 °C

Ambient temperature:

-10 °C/+50 °C

Protection class: II (EN 60730)

Protection: IP 30 (EN 60529)

Noise suppression: EN 50081-1

Noise immunity: EN 50082-1

Electrical safety: EN 60730

Probes:

Dimensions ($\varnothing$ x L): 6 x 45 mm

Sensor type:

Pt 1000, DIN EN 60751 class B

Probe cable

- **Collector sensor:**
Silicone cable, 1.5 m, 2 x 0.5 mm²
-30 °C/+170 °C
- **Standard sensor:**
Oil-resistant cable, 2.5 m,
2 x 0.5 mm² -5 °C/+80 °C

Solar controller SR1R

Similar to SR 1, but with integrated overheating protection function. In automatic mode, the overheating protection prevents excessive temperatures in the solar circuit if no water is withdrawn or in case of intensive sunshine. The pump remains on even if the set maximum storage tank temperature T_{max} is exceeded. This allows the system to be cooled down via the collector after sundown. When T_{max} is reached, the pump is switched off. If the maximum collector temperature is exceeded in automatic mode, the pump is switched on to prevent further heating up, thereby protecting the collector from possible damage.

DG: H	PU	Part no.	Price €
Solar controller SR1	1	78493	
Solar controller SR1R	1	78494	

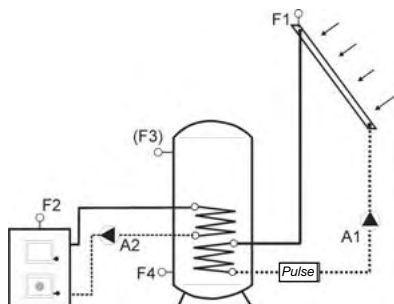
Differential solar controllers SD 1, SD 2 and SD 3



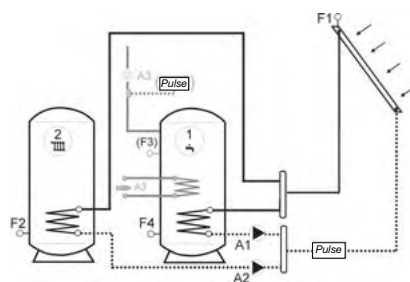
Differential solar controllers (series SD 1 - SD 3)



Application example SD 2



Application example SD 3



Application

Advanced solar systems are primarily used to heat process and pool water and to support room heating systems. The differential solar controllers SD 1, SD 2 and SD 3 are used in solar systems with flat plate or tube collectors to control the circulation pump, to cool the storage tank and, if necessary, to reheat by means of priority control.

Description

The differential solar controller consists of a digital display and control unit as well as a collector and storage tank sensor. If the temperature difference adjusted on the controller is exceeded (the collector sensor is then warmer than the storage tank sensor), the circulation pump is switched on and the solar energy is supplied to the storage tank. If the temperature difference falls below a pre-set value, the pump is switched off. When the temperature falls below the required temperature in the draw-off area of the storage tank, a priority control signal is sent to the actual heating controller.

- LCD display with temperature, operating state and heat quantity calculation
- Simple programming
- Automatic configuration and sensor recognition
- Pump kick function
- Daily and total yield (in kW/MW)

Control functions of the differential controller	SD 1	SD 2	SD 3
Solar control	●	●	●
Solid fuel boiler control	●	●	●
Solid fuel boiler control for 2 storage tanks			●
Solid fuel boiler control with solar integration		●	●
Solar control with 2 collectors		●	●
Solar control with 2 storage tanks valve switching		●	●
Solar control with 2 storage tanks - 2 pumps			●
Solar control with reheating function		●	●
Solar control with return flow increase of the heating system		●	●
Solid fuel boiler control with return flow increase via mixer			●
Solar control with 2 cascaded storage tanks			●
Solar control with stratifier			●
Sensor connections available (inputs)	3	4	4
Relay contacts	1	2	3

Technical specifications

Probes:

Collector sensor KLF (F1 and F2):

Pt 1000, 1 kOhm, $\pm 0.2\%$ at 0°C

Storage tank sensor SPF (F3 and F4):

NTC, 5 kOhm, $\pm 1\%$ at 25°C

Control unit:

Adjustment range SD1 – SD3

Maximum temperature:

Collector $80^\circ\text{C}/180^\circ\text{C}$

Storage tank $10^\circ\text{C}/130^\circ\text{C}$

Solid fuel boiler $30^\circ\text{C}/130^\circ\text{C}$

Current flow terminal L1: 6.3 A max.

Power reserve of timer: > 10 h

Operating temperature range:

Ambient $0^\circ\text{C}/50^\circ\text{C}$

Storage $-20^\circ\text{C}/60^\circ\text{C}$

Supply voltage: AC 230 V

Power consumption: Max. 5 VA

Contact rating: 250 V, 2 (2) A

Housing: Plastic housing

W x H x D: 148 x 96 x 75 mm

Protection: IP 40 (EN 60529)

Protection class: II, protective insulation (EN 60730)

DG: H	PU	Part no.	Price €
AFRISO SD 1	1	69299	
AFRISO SD 2	1	69300	
AFRISO SD 3	1	69301	
Boiler sensor KLF 1000	1	69302	
(F1 and F2: Pt 1000, 1 kOhm, with silicone cable 1.5 m)			
Storage tank sensor SPF	1	69326	
(F3 and F4: NTC, 5 kOhm)			

Chapter 10

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Temperature measuring instruments and controllers

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Bimetal thermometers for heating and plumbing applications



Application

Heating, plumbing, distribution systems and underfloor heating manifolds

Nominal size

40

Measuring element

Bimetal spiral

Accuracy class

2 (EN 13190)

Ranges

0/60 °C

Working temperature

Full scale value

Operating pressure

No pressure

Standard version

Connection

Plastic, push-in, Ø 15 mm, no pocket

Mounting position

Centre back

Dial

Plastic, white - dial marking black

Pointer

Plastic, black

Housing

ABS, white

Front glass

Clip-in plastic



Application

Heating, plumbing, distribution systems and underfloor heating manifolds

Nominal size

50

Measuring element

Bimetal helix

Accuracy class

2 (EN 13190)

Ranges

0/60 °C

Working temperature

Full scale value

Operating pressure at pocket

Max. 6 bar

Standard version

Connection

Stem plastic, Ø 9 mm, pocket G $\frac{1}{2}$ B, plastic, removable

Mounting position

Centre back

Dial

Plastic, white - dial marking black

Pointer

Plastic, black

Housing

ABS, white

Front glass

Clip-in plastic



Application

Heating, plumbing

Nominal size

63 - 80 - 100

Measuring element

Bimetal helix

Accuracy class

2 (EN 13190)

Ranges

-20/+60, 0/60, 0/120 °C

Working temperature

Full scale value

Operating pressure at pocket

Max. 6 bar

Standard version

Connection

Brass stem, Ø 9 mm, brass pocket G $\frac{1}{2}$ B, removable, stem length 40 mm optional self-sealing thread with PTFE sealing ring

Mounting position

Centre back
(NG 63 optionally bottom back)

Dial

Plastic, white - dial marking black

Pointer

Plastic, black

Housing

ABS, black

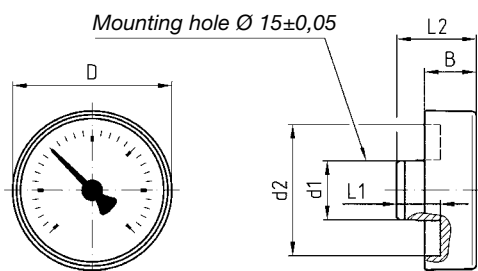
Front glass

Clip-in plastic

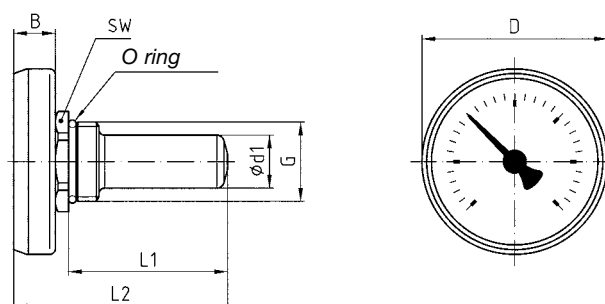
Bimetal thermometers for heating and plumbing applications

Housing types and dimensions

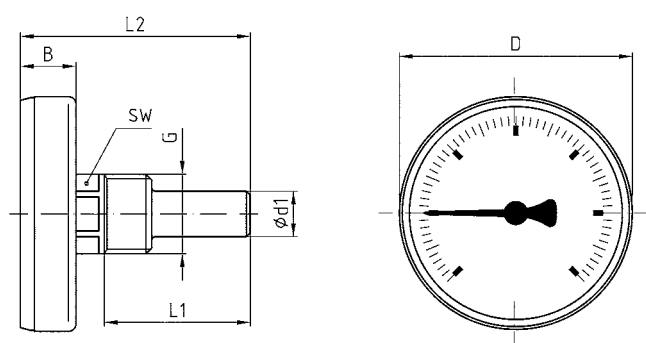
Centre back connection, NG 40



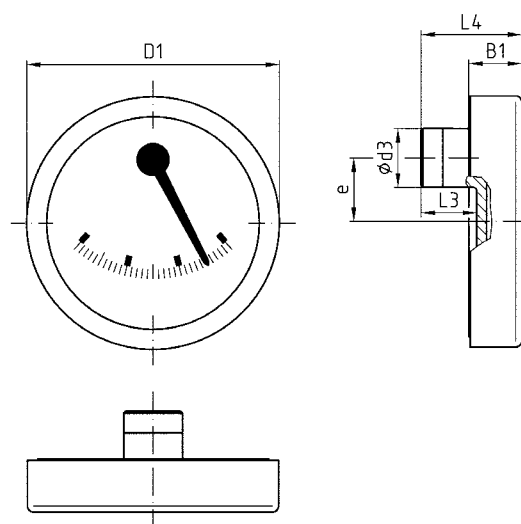
Centre back connection, NG 50



Centre back connection, NG 63 - 80 - 100



Bottom back connection, NG 63

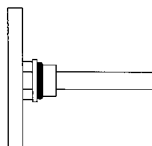
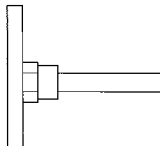
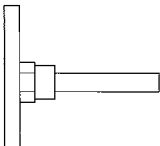
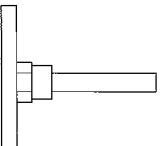


Dimensions (mm)

Nominal size (NG)	B	B ₁	D	D ₁	d ₁	d ₂	d ₃	e	G	L ₁	L ₂	L ₃	L ₄	SW
40	13	-	40	-	14.8	33	-	-	-	11	50	-	-	-
50	11	-	49	-	14	-	-	-	G ¹ / ₂ B	42	56.5	-	-	24
63	14.7	13	62	63.5	12	-	14.8	16	G ¹ / ₂ B	40/63/100/150	61/85/122/172	14	25	19
80	14.3	-	79	-	12	-	-	-	G ¹ / ₂ B	40/63/100/150	61/85/122/172	-	-	19
100	15	-	100	-	12	-	-	-	G ¹ / ₂ B	40/63/100/150	61/85/122/172	-	-	19

Bimetal thermometers for heating and plumbing applications

DG: G

Type	BiTh 40 K	BiTh 50 K	BiTh 63 K	BiTh 80 K	BiTh 100 K
Version					
Housing-Ø	40	50	63	80	100
Housing	ABS, white	ABS, white	ABS, black, clip-in plastic front glass		
Stem	Plastic, Ø 15 mm	Plastic, Ø 9 mm	Brass, Ø 9 mm		
Connection	Plastic, plug-on, no thermowell	Thermowell G ¹ / ₂ B, plastic	Thermowell G ¹ / ₂ B, brass, outside Ø 12 mm, removable		
Accuracy class	Class 2 according to EN 13190				
Range	-20/+60 °C		-20/+60 °C		-20/+60 °C
Stem length		PU*		PU*	
40 mm	---			100	50
63 mm	---			100	50
100 mm	---			100	50
150 mm	---			50	25
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
40 mm	64066	100	100	100	50
63 mm	(refer to drawing for stem)			100	50
100 mm	---			100	50
150 mm	---			50	25
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length					
40 mm with PTFE sealing ring	---			100	50
40 mm	---			100	50
63 mm	---			100	50
100 mm	---			100	50
150 mm	---			50	25

Spare thermowells

Connection G ¹ / ₂ B, brass	Part no.	Price
Stem length		
40 mm with PTFE sealing ring	63685	
40 mm	63856	
63 mm	63686	
100 mm	63687	
150 mm	63688	

* Minimum ordering quantity 1 PU (packing unit)
Delivery only in packing units

Bimetal standard thermometers/surface mounting thermometers/flue gas thermometers



Bimetal standard thermometers

Application

Heating, plumbing

Nominal size

50 - 63 - 80 - 100 - 160

Measuring element

Bimetal helix

Accuracy class

2 (EN 13190)

Ranges °C

-20/60, 0/60, 0/120, 0/160

Working temperature

Full scale value

Operating pressure at thermowell

Max. 6 bar

Standard version

Connection

Stem brass, Ø 9 mm, thermowell brass G $\frac{1}{2}$ B, removable

Mounting position

NG 50 - 63 - 80 - 100 - 160

centre back

NG 63 - 80 - 100 bottom

Dial

Up to 120 °C plastic,

≥ 160 °C aluminium, white

Dial marking black

Pointer

Plastic, black

Housing

Sheet steel, galvanised

Push on bezel

Sheet steel, nickel-plated

Front glass

Plastic

Options

- Other ranges
- Nominal size 34

Refer to pages 165-167 for part no.



Surface mounting thermometers

Application

Heating, plumbing

Nominal size

63 - 80

Measuring element

Bimetal spiral

Accuracy class

2 (EN 13190)

Ranges °C

0/60, 0/120

Working temperature

Full scale value

Standard version

Connection

NG 63 with heat-conducting element and fastening spring or universal clamp for pipes $\frac{3}{8}$ " to $1\frac{1}{2}$ "

NG 80 with heat-conducting element and fastening spring

Mounting position

NG 63 - 80 centre back

Dial

Aluminium, white -

dial marking black

Pointer

Plastic, black

Housing

Sheet steel, galvanised

Push on bezel

Sheet steel, nickel-plated

Front glass

Plastic

Options

- Other ranges



Flue gas thermometer RT Flue gas temperature controller RTC

Application

Burner control for gas and oil burners

Nominal size

80

Measuring element

Bimetal helix

Accuracy class

2 (EN 13190)

Ranges °C

RT: 0/300, 0/500

RTC: 0/350

Working temperature

Full scale value

Standard version

Connection

RT: Stem stainless steel 1.4571, plain, with adjustable cone, brass

RTC: Stem stainless steel 1.4571, plain, with magnetic ring holder

Mounting position

Centre back

Dial

Aluminium, grey - dial marking black
RTC with green and red reference zones

Pointer

Aluminium, black

RTC with additional max. pointer

Housing

Sheet steel, galvanised

Push on bezel

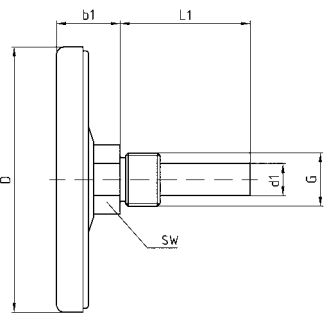
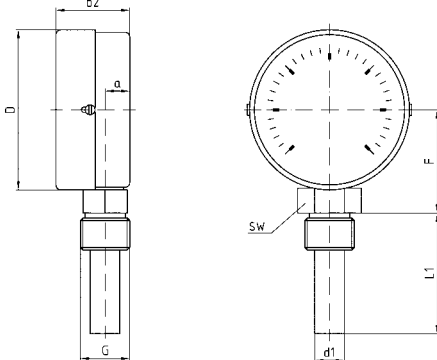
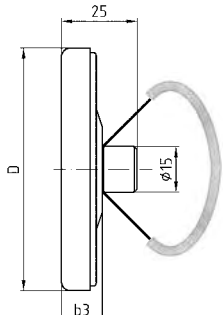
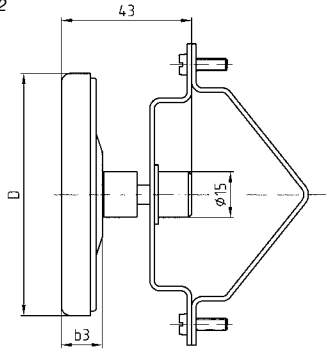
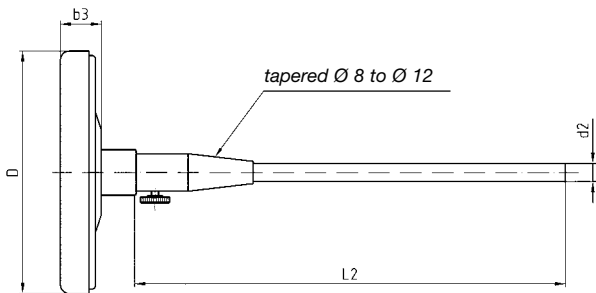
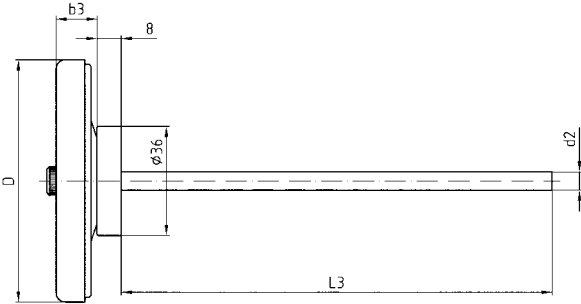
Sheet steel, nickel-plated

Front glass

Plastic

Bimetal standard thermometers/surface mounting thermometers/flue gas thermometers

Housing types and dimensions

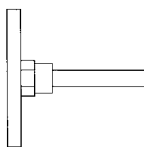
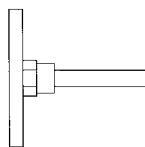
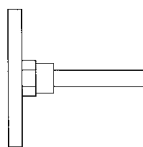
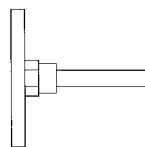
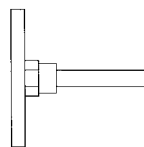
Bimetal standard thermometers Centre back connection 	Bimetal standard thermometers Bottom connection 
Surface mounting thermometers Centre back connection, with fastening spring 	Surface mounting thermometers Centre back connection, with universal clamp for pipes 3/8" to 1 1/2" 
Flue gas thermometer RT Centre back connection 	Flue gas temperature controller RTC Centre back connection 

Dimensions (mm)

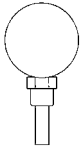
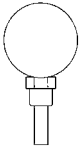
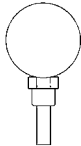
Nominal size (NG)	a	b1	b2	b3	D	d1	d2	F	G	L1	L2	L3	SW		
50	-	18	-	-	50	12	-	-	G1/2B	45	142	142	19/22		
63	10	20	35	13.5	63	12	-	29.3	G1/2B	68	290		19/22		
80	10	21	33	13.5	80	12	6	47.3	G1/2B	100			19/22		
100	10	23.7	40.5	-	100	12	-	59.3	G1/2B	150			19/22		
160	10	22	-	-	160	12	-	-	G1/2B	200			19/22		

Bimetal standard thermometers

DG: G

Type	BiTh 50	BiTh 63	BiTh 80	BiTh 100	BiTh 160
Version					
Housing-Ø	50	63	80	100	160
Housing	Sheet steel, galvanised, push on bezel nickel-plated, plastic front glass				
Stem	Brass, Ø 9 mm				
Connection	Thermowell G1½B, brass, outside Ø 12 mm, removable				
Accuracy class	Class 2 according to EN 13190				
Minimum order quantity for non-stock items = 10 pieces					
Range		-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length		Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	---	63951	63955	63959	63963
68 mm	---	63952	63956	63960	63964
100 mm	---	63953	63957	63961	63981
150 mm	---	63954	63958	63962	63982
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	64027	63860	63865	63869	63873
68 mm	64028	63861	63866	63870	63874
100 mm	64029	63862	63867	63871	63875
150 mm	64030	63864	63868	63872	63876
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	64031	63801	63806	63811	63816
68 mm	64032	63802	63807	63812	63817
100 mm	64033	63803	63808	63813	63818
150 mm	64034	63804	63809	63814	63819
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length		Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	---	63983	63987	64015	64019
68 mm	---	63984	63988	64016	64020
100 mm	---	63985	63989	64017	64021
150 mm	---	63986	63990	64018	64022

Bimetal standard thermometers

Type	BiTh 63	BiTh 80	BiTh 100	
Version				
Housing-Ø	63	80	100	
Housing	Sheet steel, galvanised, push on bezel nickel-plated, plastic front glass			
Stem	Brass, Ø 9 mm			
Connection	Thermowell G ¹ / ₂ B, brass, outside Ø 12 mm, removable			
Accuracy class	Class 2 according to EN 13190			
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	
45 mm	64039	64055	64073	
68 mm	64040	64056	64074	
100 mm	64041	64057	64075	
150 mm	64042	64058	64076	
Range	0/60 °C	0/60 °C	0/60 °C	
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	
45 mm	64043	64059	64077	
68 mm	64044	64060	64078	
100 mm	64045	64061	64079	
150 mm	64046	64062	64080	
Range	0/120 °C	0/120 °C	0/120 °C	
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	
45 mm	64047	64063	64081	
68 mm	64048	64064	64082	
100 mm	64049	64067	64083	
150 mm	64050	64068	64084	

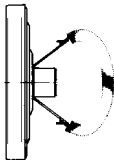
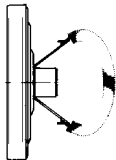
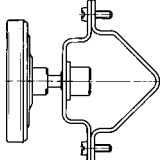
Spare thermowells

DG: G

Connection G ¹ / ₂ B, brass (only for bottom connection)		
Stem length	Part no.	Price €
45 mm	63850	
68 mm	63851	
100 mm	63852	
150 mm	63853	

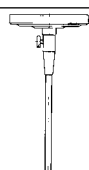
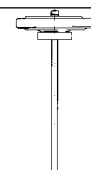
Surface mounting thermometers/ eccentric thermometers

DG: G

Type	Ath 63 F	Ath 80 F	Ath 63 S	BiTh 63 exz
Version				
Housing-Ø	63	80	63	63
Housing	Sheet steel, galvanised, push on bezel nickel-plated, plastic front glass			Plastic
Connection	Heat-conducting element with fastening spring for pipes 3/8" to 1 1/2"		Universal clamp for pipes 3/8" to 1 1/2"	Eccentric male connector Ø 15 mm
Accuracy class	Class 2 according to EN 13190			
Range	0/120 °C	0/120 °C	0/120 °C	20/100 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	63822	63821	63820	68895
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	63826	---	---	---

Flue gas thermometers/thermometers for heating installations

DG: G

Type	RT 80		RTC 80	HTh 160 G	HTh 160 W
Version					
Housing-Ø	80		80	160	160
Housing	Sheet steel, galvanised, push on bezel nickel-plated, plastic front glass			Aluminium, brass-coloured, straight version	Aluminium, brass-coloured, angled version 90°
Connection	Plain stem, stainless steel 1.4571, adjustable cone		Plain stem, stainless steel 1.4571, magnet	Screw-in pocket G1½B brass	
Accuracy class	Class 2 according to EN 13190				
Range	0/300 °C	0/500 °C	0/350 °C	0/130 °C	0/130 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
40 mm	---	---	---	63931	63932
100 mm	---	---	63833	Glass insert	Glass insert
150 mm	64238	63830	63832	63941	63942
300 mm	64239	63831	---	---	---

Bimetal thermometers for industrial applications

Bimetal air duct thermometers



Bimetal thermometers for industrial applications

Application

Machines, plants, pipe engineering, boilers, heating technology

Type

D2

Nominal size

63 - 80 - 100 - 160

Measuring element

Bimetal helix

Accuracy class

1 (EN 13190)

Ranges °C

-20/60, 0/60, 0/120, 0/160

Working temperature

Full scale value

Operating pressure at thermowell

Max. 6 bar

Protection

IP 41 (EN 60529)

Standard version

Connection

Stem brass, Ø 9 mm

Thermowell G1½B, brass, removable

Mounting position

NG 63 - 80 - 100 - 160 centre back

NG 63 - 80 - 100 - 160 bottom



Dial

Aluminium, white, dial marking black

Pointer

Aluminium, black

Housing

Sheet steel, galvanised

Push on bezel

Sheet steel, nickel-plated

Front glass

Instrument glass

Options

- Other connection types
- Other ranges
- Other stem lengths

Bimetal air duct thermometers

Application

Air conditioning, ventilation

Type

D2

Nominal size

63 - 80 - 100

Measuring element

Bimetal helix

Accuracy class

2 (EN 13190)



Ranges °C

-30/50, -20/60, -20/40, 0/60

Working temperature

Full scale value

Protection

IP 41 (EN 60529)

Standard version

Connection

Stem brass, Ø 9 mm

Mounting flange, steel Ø 80 mm or

back flange, steel

Mounting position

NG 63 - 80 - 100 centre back

Dial

Aluminium, white, dial marking black

Pointer

Aluminium, black

Housing

Sheet steel, galvanised

Push on bezel

Sheet steel, nickel-plated

Front glass

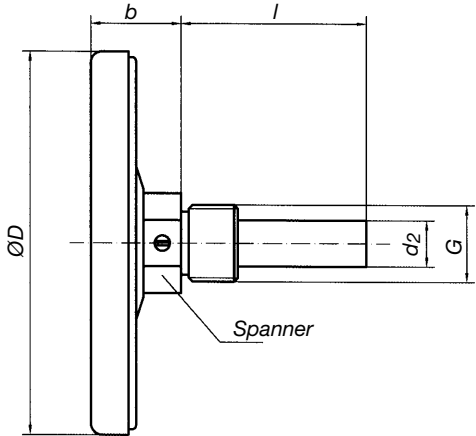
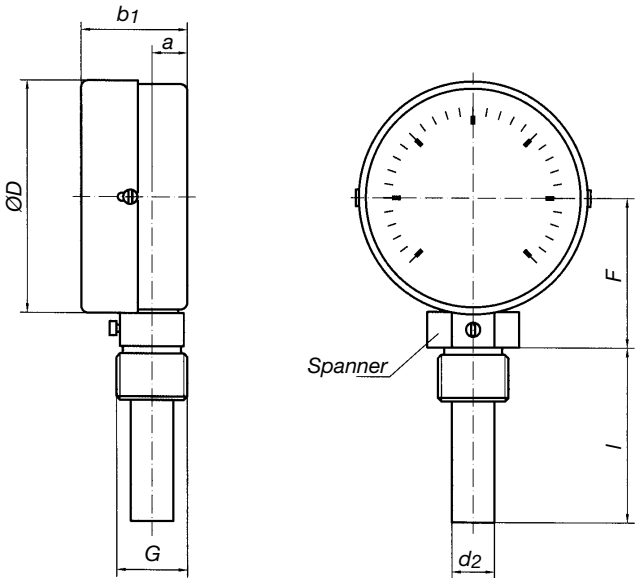
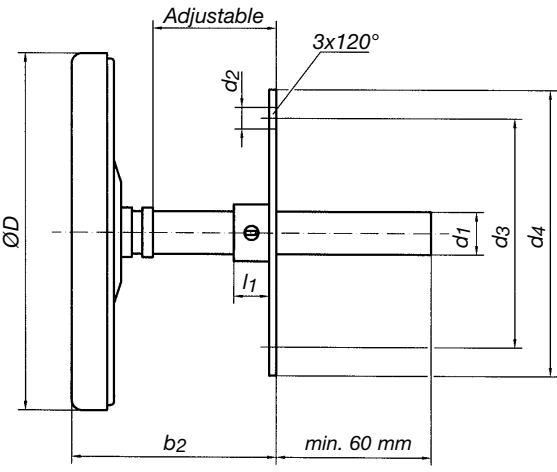
Instrument glass

Options

- Other ranges
- Other stem lengths
- Accuracy class 1

Bimetal thermometers for industrial applications/ bimetal air duct thermometers

Housing types and dimensions

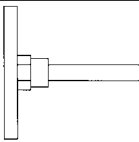
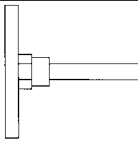
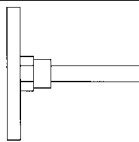
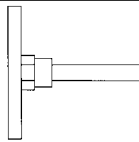
Bimetal thermometers for industrial applications Centre back connection 	Bottom connection 
Bimetal air duct thermometers Centre back connection 	

Dimensions (mm)

Nominal size (NG)	a	b	b ₁	b ₂	D	d ₁	d ₂	d ₃	d ₄	F	G	l	l ₁	SW	
63	10	24	34	Adjustable	63	9	6	52	80	43.5	G ¹ / ₂ B	45	10	21/22	
80	10	24	36		80	9	6	52	80	52	G ¹ / ₂ B	63	10	21/22	
100	10	26	36		100	9	6	52	80	62	G ¹ / ₂ B	100	10	21/22	
160	-	32	37		160	9	6	-	-	92	G ¹ / ₂ B	150	-	21/22	

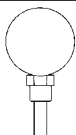
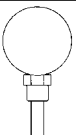
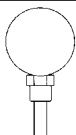
Bimetal thermometers for industrial applications

DG: H

Type	BiTh 63 I D211	BiTh 80 I D211	BiTh 100 I D211	BiTh 160 I D211
Version				
Housing-Ø	63	80	100	160
Housing	Sheet steel, galvanised, push on bezel nickel-plated, instrument grade front glass			
Stem	Brass, Ø 9 mm			
Connection	Thermowell G ¹ / ₂ B, brass, outside Ø 12 mm, removable			
Accuracy class	Class 1 according to EN 13190			
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	65106211	65206211	65306211	65406211
63 mm	65107211	65207211	65307211	65407211
100 mm	65108211	65208211	65308211	65408211
150 mm	65109211	65209211	65309211	65409211
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	65131211	65231211	65331211	65431211
63 mm	65132211	65232211	65332211	65432211
100 mm	65133211	65233211	65333211	65433211
150 mm	65134211	65234211	65334211	65434211
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	65146211	65246211	65346211	65446211
63 mm	65147211	65247211	65347211	65447211
100 mm	65148211	65248211	65348211	65448211
150 mm	65149211	65249211	65349211	65449211
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	65151211	65251211	65351211	65451211
63 mm	65152211	65252211	65352211	65452211
100 mm	65153211	65253211	65353211	65453211
150 mm	65154211	65254211	65354211	65454211

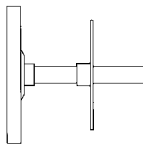
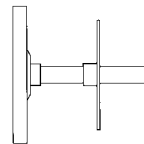
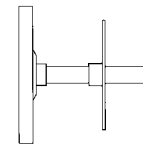
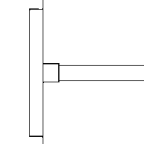
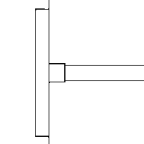
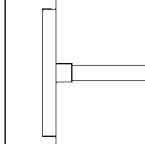
Bimetal thermometers for industrial applications

DG: H

Type	BiTh 63 I D201	BiTh 80 I D201	BiTh 100 I D201	BiTh 160 I D201
Version				
Housing-Ø	63	80	100	160
Housing	Sheet steel, galvanised, push on bezel nickel-plated, instrument grade front glass			
Stem	Brass, Ø 9 mm			
Connection	Thermowell G ¹ / ₂ B, brass, outside Ø 12 mm, removable			
Accuracy class	Class 1 according to EN 13190			
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	65106201	65206201	65306201	65406201
63 mm	65107201	65207201	65307201	65407201
100 mm	65108201	65208201	65308201	65408201
150 mm	65109201	65209201	65309201	65409201
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	65131201	65231201	65331201	65431201
63 mm	65132201	65232201	65332201	65432201
100 mm	65133201	65233201	65333201	65433201
150 mm	65134201	65234201	65334201	65434201
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	65146201	65246201	65346201	65446201
63 mm	65147201	65247201	65347201	65447201
100 mm	65148201	65248201	65348201	65448201
150 mm	65149201	65249201	65349201	65449201
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
45 mm	65151201	65251201	65351201	65451201
63 mm	65152201	65252201	65352201	65452201
100 mm	65153201	65253201	65353201	65453201
150 mm	65154201	65254201	65354201	65454201

Bimetal air duct thermometers

DG: H

Type	BiTh 63 LKF D211	BiTh 80 LKF D211	BiTh 100 LKF D211	BiTh 63 LKB D271	BiTh 80 LKB D271	BiTh 100 LKB D271
Version						
Housing-Ø	63	80	100	63	80	100
Housing	Sheet steel, galvanised, push on bezel nickel-plated, instrument grade front glass			Sheet steel, galvanised, push on bezel nickel-plated, with back flange, instrument grade front glass		
Stem	Brass, Ø 9 mm					
Connection	Flange, steel, Ø 80 mm* with locking screw			plain		
Accuracy class	Class 2 according to EN 13190					
Range	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
100 mm	65613211	65713211	65813211	65613271	65713271	65813271
150 mm	65614211	65714211	65814211	65614271	65714271	65814271
200 mm	65615211	65715211	65815211	65615271	65715271	65815271
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
100 mm	65608211	65708211	65808211	65608271	65708271	65808271
150 mm	65609211	65709211	65809211	65609271	65709271	65809271
200 mm	65610211	65710211	65810211	65610271	65710271	65810271
Range	-20/+40 °C	-20/+40 °C	-20/+40 °C	-20/+40 °C	-20/+40 °C	-20/+40 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
100 mm	65623211	65723211	65823211	65623271	65723271	65823271
150 mm	65624211	65724211	65824211	65624271	65724271	65824271
200 mm	65625211	65725211	65825211	65625271	65725271	65825271
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
100 mm	65633211	65733211	65833211	65633271	65733271	65833271
150 mm	65634211	65734211	65834211	65634271	65734271	65834271
200 mm	65635211	65735211	65835211	65635271	65735271	65835271

*Version with Ø 40 mm flange available at no additional cost.
Refer to pages 182-184 for options and part no.

Bimetal stainless steel thermometers

Bimetal thermometers for chemical applications



Bimetal stainless steel thermometers

Application

For corrosive media. Suitable for a great variety of industrial applications.

Type

D3

Nominal size

63 - 80 - 100

Measuring element

Bimetal helix

Accuracy class

1 (EN 13190)

Ranges °C

-20/60, 0/60, 0/120, 0/160

Working temperature

Full scale value

Operating pressure at thermowell

Max. 6 bar

Protection

IP 43 (EN 60529)

Standard version

Connection

Stem stainless steel 1.4571, Ø 8 mm, plain, adjustable

Mounting position

NG 63 - 80 - 100 centre back
 NG 63 - 100 bottom

Dial

Aluminium, white - dial marking black

Pointer

Aluminium, black

Housing and push on bezel

Stainless steel 1.4301

Front glass

Instrument glass

Options

- Thermowell G¹/₂B, stainless steel 1.4571
- Other connection types
- Other ranges
- Other stem lengths



Bimetal thermometers for chemical applications

Application

For corrosive media. Meets exacting measuring demands, e.g. in chemical, process technology and food industry applications.

Type

D4

Nominal size

63 - 100 - 160

Measuring element

Bimetal helix

Accuracy class

1 (EN 13190)

Ranges °C

-20/60, 0/60, 0/120, 0/160

Working temperature

Continuous: full scale value
 Short-term: 1.1 x full scale value

Operating pressure at thermowell

Max. 6 bar

Protection

IP 65 (EN 60529)

Standard version

Connection

Stem stainless steel 1.4571, Ø 8 mm, plain, closed

Mounting position

NG 63 - 100 - 160 centre back
 NG 63 - 100 - 160 bottom

Dial

Aluminium, white, dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Instrument glass

Options

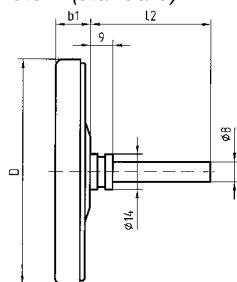
- Thermowell G¹/₂B, stainless steel 1.4571
- Grooved nut connection according to DIN 11851
- Other connection designs
- Other ranges
- Other stem lengths
- Laminated safety front glass
- Glycerine filling (type D4 only)
- Rotatable/tiltable housing (type D4 only)
- 3-hole fixing, panel mounting bezel
- Back flange
- Special materials
- Electrical contacts

Bimetal stainless steel thermometers/ Bimetal thermometers for chemical applications

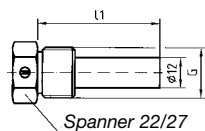
Housing types and dimensions

Bimetal stainless steel thermometer - centre back connection

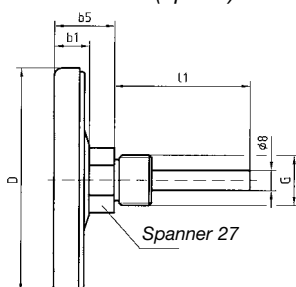
Plain stem (standard)



Separate thermowell
(option)

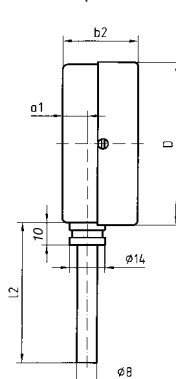


Fixed connection (option)

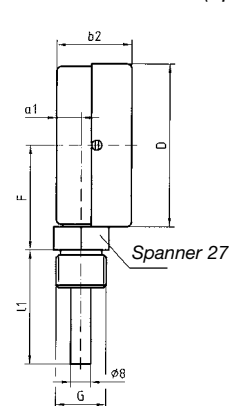


Bimetal stainless steel thermometer - bottom connection

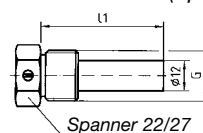
Plain stem (standard)



Fixed connection (option)

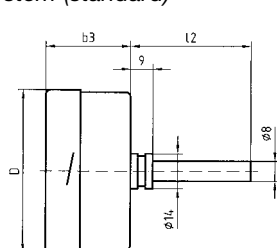


Separate thermowell (option)

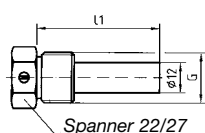


Bimetal thermometers for chemical applications - centre back connection

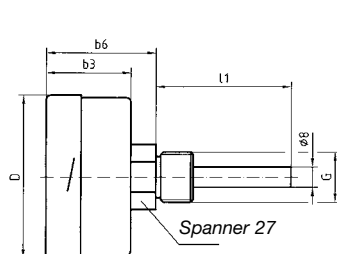
Plain stem (standard)



Separate thermowell
(option)

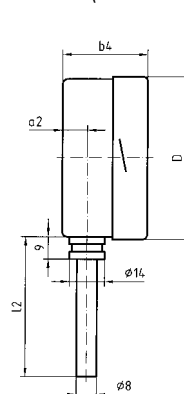


Fixed connection (option)

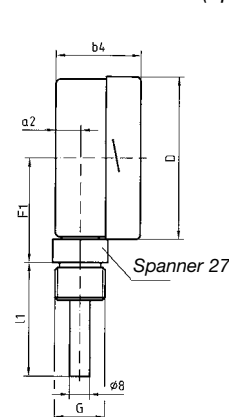


Bimetal thermometers for chemical applications - bottom connection

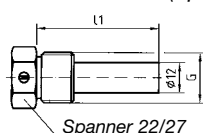
Plain stem (standard)



Fixed connection (option)



Separate thermowell (option)

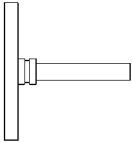
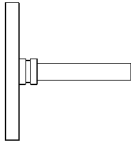
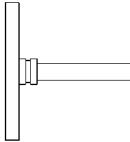
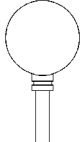
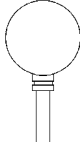


Dimensions (mm)

Nominal size (NG)	D	a1	a2	b1	b2	b3	b4	b5	b6	F	F1	G	l1	l2	
63	63	10	15.5	13	34	32	45	27	62	46.5	58.5	G ¹ / ₂ B	45	49	
80	80	-	-	14	-	-	-	28	-	-	-	G ¹ / ₂ B	63	67	
100	100	10	17.5	15	36	27.5	49.5	29	57.5	65	77.5	G ¹ / ₂ B	100	104	
160	160	10	15.5	18	-	34	48	32	64	95	107.5	G ¹ / ₂ B	150	154	
													200	204	

Bimetal stainless steel thermometers

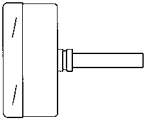
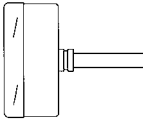
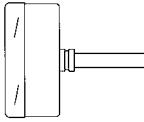
DG: H

Type	BiTh 63 E D312	BiTh 80 E D312	BiTh 100 E D312	BiTh 63 E D302	BiTh 100 E D302
Version					
Housing-Ø	63	80	100	63	100
Housing	Stainless steel 1.4301 with push on bezel 1.4301, instrument front glass				
Stem	Stainless steel 1.4571, Ø 8 mm				
Connection	Plain stem (without thermowell)*				
Accuracy class	Class 1 according to EN 13190				
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
For thermowell with length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
63 mm	66107312	66207312	66307312	66107302	66307302
100 mm	66108312	66208312	66308312	66108302	66308302
150 mm	66109312	66209312	66309312	66109302	66309302
200 mm	66110312	66210312	66310312	66110302	66310302
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
For thermowell with length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
63 mm	66132312	66232312	66332312	66132302	66332302
100 mm	66133312	66233312	66333312	66133302	66333302
150 mm	66134312	66234312	66334312	66134302	66334302
200 mm	66135312	66235312	66335312	66135302	66335302
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
For thermowell with length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
63 mm	66147312	66247312	66347312	66147302	66347302
100 mm	66148312	66248312	66348312	66148302	66348302
150 mm	66149312	66249312	66349312	66149302	66349302
200 mm	66150312	66250312	66350312	66150302	66350302
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
For thermowell with length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
63 mm	66152312	66252312	66352312	66152302	66352302
100 mm	66153312	66253312	66353312	66153302	66353302
150 mm	66154312	66254312	66354312	66154302	66354302
200 mm	66155312	66255312	66355312	66155302	66355302

*Refer to pages 181/182 for other connection types.
Refer to pages 182-184 for options and part no.

Bimetal thermometers for chemical applications

DG: H

Type	BiTh 63 Ch D412	BiTh 100 Ch D412	BiTh 160 Ch D412	BiTh 63 Ch D402	BiTh 100 Ch D402	BiTh 160 Ch D402
Type						
Housing-Ø	63	100	160	63	100	160
Housing	Stainless steel 1.4301 with bayonet type bezel, instrument front glass					
Stem	Stainless steel 1.4571, Ø 8 mm					
Connection	Plain stem (without thermowell)*					
Accuracy class	Class 1 according to EN 13190					
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
For thermowell with length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
63 mm	66607412	66807412	66907412	66607402	66807402	66907402
100 mm	66608412	66808412	66908412	66608402	66808402	66908402
150 mm	66609412	66809412	66909412	66609402	66809402	66909402
200 mm	66610412	66810412	66910412	66610402	66810402	66910402
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
For thermowell with length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
63 mm	66632412	66832412	66932412	66632402	66832402	66932402
100 mm	66633412	66833412	66933412	66633402	66833402	66933402
150 mm	66634412	66834412	66934412	66634402	66834402	66934402
200 mm	66635412	66835412	66935412	66635402	66835402	66935402
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
For thermowell with length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
63 mm	66647412	66847412	66947412	66647402	66847402	66947402
100 mm	66648412	66848412	66948412	66648402	66848402	66948402
150 mm	66649412	66849412	66949412	66649402	66849402	66949402
200 mm	66650412	66850412	66950412	66650402	66850402	66950402
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
For thermowell with length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
63 mm	66652412	66852412	66952412	66652402	66852402	66952402
100 mm	66653412	66853412	66953412	66653402	66853402	66953402
150 mm	66654412	66854412	66954412	66654402	66854402	66954402
200 mm	66655412	66855412	66955412	66655402	66855402	66955402

*Refer to pages 181/182 for other connection types.
Refer to pages 182-184 for options and part no.

Gas filled thermometers for chemical applications



Application

For corrosive media. Meets exacting measuring demands, e.g. in chemical, process technology and food industry applications.

Type

D4

Nominal size

100 - 160

Measuring principle

Pressurised gas filling

Accuracy class

1 (EN 13190)

Ranges °C

-20/60, 0/60, 0/120, 0/160, 0/200, 0/300, 0/400, 0/500

Working temperature

Continuous: full scale value

Short-term: 1.1 x full scale value

Operating pressure at thermowell

Max. 10 bar (up to 300 °C)

Protection

IP 65 (EN 60529)

Standard version

Connection

Stem stainless steel 1.4541, 100 x 10 mm, plain

Mounting position

Centre back or bottom, with joint

Dial

Aluminium, white
Dial marking black

Pointer

Aluminium, black

Zero correction

At side of housing

Movement

Brass

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Instrument glass

Options

- Rotatable/tiltable housing
- Thermowell G $\frac{1}{2}$ B, stainless steel 1.4541
- Grooved nut connection according to DIN 11851
- Nominal size 250
- Other connection designs
- Other ranges
- Special scales
- Glycerine filling (type D8)
- 3-hole fixing panel mounting bezel
- Back flange
- Capillary (stainless steel 1.4541)
- Special materials
- Electrical contacts

Gas filled thermometers

Version for chemical applications type D 4 - NG 100/160

Housing types and dimensions

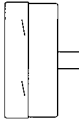
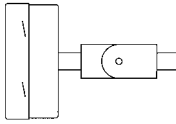
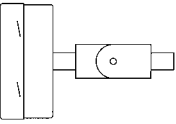
Centre back connection	Bottom connection
Rotatable/tiltable housing	Version with capillary and wall bracket
Version with capillary and back flange	Version with capillary and 3-hole fixing panel mounting bezel

Dimensions (mm)

Nominal size (NG)	a	b	b1	Ø D	Ø d1	Ø d2	Ø d3		
100	13	45	51	101	132	116	5.5		
160	13	45	51	161	196	178	6		
250	13	55	57	252	285	270	6		

Gas filled thermometers for chemical applications

DG: H

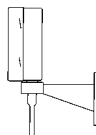
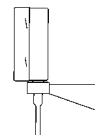
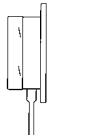
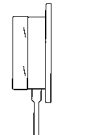
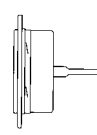
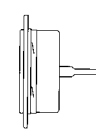
Type	FTh 100 Ch D412	FTh 160 Ch D412	FTh 100 Ch D402	FTh 160 Ch D402	FTh 100 Ch D482	FTh 160 Ch D482
Version						
Housing-Ø	100	160	100	160	100	160
Housing	Stainless steel 1.4301 with bayonet type bezel, instrument front glass					
Stem	Stainless steel 1.4541, 100 x 10 mm					
Connection	Plain stem (without thermowell)*					
Filling	Pressurised gas filling					
Accuracy class	Class 1 according to EN 13190					
					Rotatable/tiltable housing	
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64341412	64343412	64341402	64343402	64341482	64343482
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64361412	64363412	64361402	64363402	64361482	64363482
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64373412	64375412	64373402	64375402	64373482	64375482
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64377412	64379412	64377402	64379402	64377482	64379482
Range	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64381412	64383412	64381402	64383402	64381482	64383482
Range	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64389412	64391412	64389402	64391402	64389482	64391482
Range	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64397412	64399412	64397402	64399402	64397482	64399482
Range	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64401412	64403412	64401402	64403402	64401482	64403482

*Refer to pages 181/182 for other connection types.

Refer to pages 182-184 for options and part no.

Gas filled thermometers for chemical applications

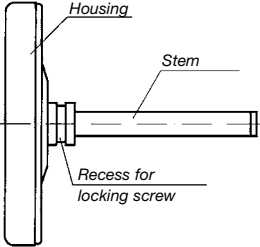
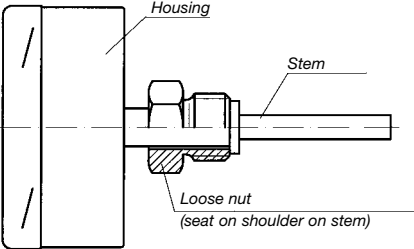
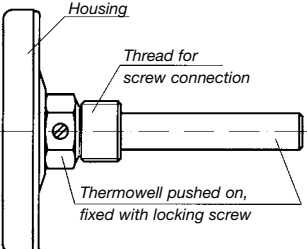
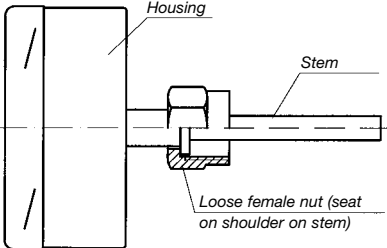
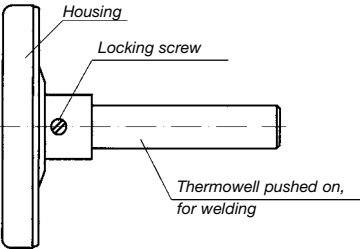
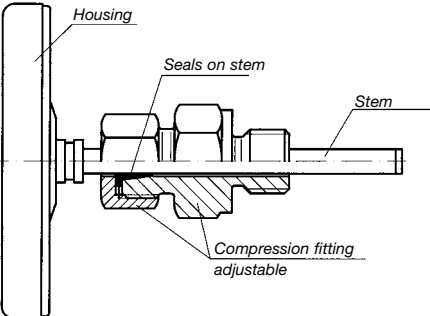
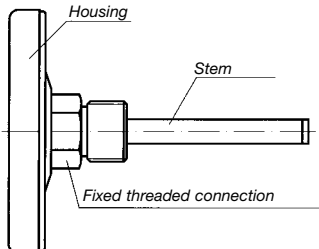
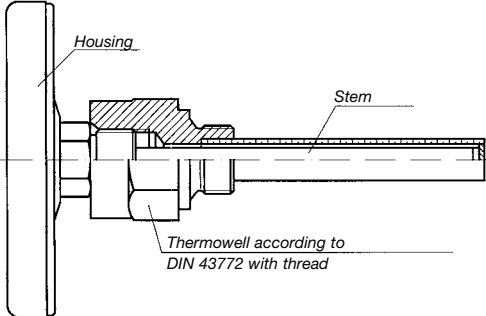
DG: H

Type	FTh 100 Ch D442	FTh 160 Ch D442	FTh 100 Ch D472	FTh 160 Ch D472	FTh 100 Ch D432	FTh 160 Ch D432
Version						
Housing-Ø	100	160	100	160	100	160
Housing	Stainless steel 1.4301 with bayonet type bezel, instrument front glass					
Stem	Stainless steel 1.4541, 100 x 10 mm					
Connection	Plain stem (without thermowell)*					
Filling	Pressurised gas filling					
Capillary	Stainless steel 1.4541, 1 metre					
Mounting	Bracket for wall mounting		Back flange		3-hole fixing panel mounting bezel 1.4301	
Accuracy class	Class 1 according to EN 13190					
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64341442	64343442	64341472	64343472	64341432	64343432
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64361442	64363442	64361472	64363472	64361432	64363432
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64373442	64375442	64373472	64375472	64373432	64375432
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64377442	64379442	64377472	64379472	64377432	64379432
Range	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64381442	64383442	64381472	64383472	64381432	64383432
Range	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64389442	64391442	64389472	64391472	64389432	64391432
Range	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64397442	64399442	64397472	64399472	64397432	64399432
Range	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64401442	64403442	64401472	64403472	64401432	64403432

*Refer to pages 181/182 for other connection types.
Refer to pages 182-184 for options and part no.

Summary of connection types for bimetal and gas filled thermometers

(industrial, stainless steel and chemical application versions)

<i>Plain stem</i>  Housing Stem Recess for locking screw	<i>Loose male connection</i>  Housing Stem Loose nut (seat on shoulder on stem)
<i>Separate screw-in thermowell (with locking screw)</i>  Housing Thread for screw connection Thermowell pushed on, fixed with locking screw	<i>Loose union nut</i>  Housing Stem Loose female nut (seat on shoulder on stem)
<i>Separate weld in thermowell (with locking screw)</i>  Housing Locking screw Thermowell pushed on, for welding	<i>Male compression fitting, adjustable on stem</i>  Housing Stem Seals on stem Compression fitting adjustable
<i>Fixed male connection</i>  Housing Stem Fixed threaded connection	<i>DIN thermowell</i>  Housing Stem Thermowell according to DIN 43772 with thread

Additional costs - connection types for bimetal and gas filled thermometers (industrial, stainless steel and chemical application versions)

DG: H

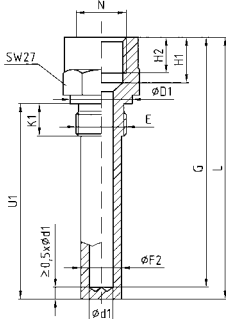
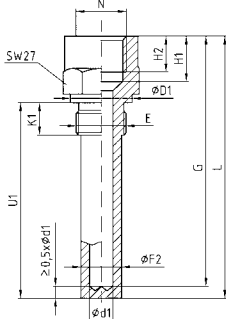
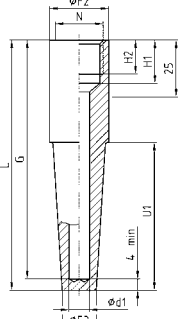
Type		Bimetal thermometers			Gas filled thermometers			
Material		Brass	Steel	Stainless steel 1.4571	Brass	Steel	Stainless steel 1.4541	Stainless steel 1.4571
	Stem length mm	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
Separate screw-in thermowell (with locking screw), G ¹ / ₂ B for stem up to Ø 8 mm for bimetal th Ø 10 mm for gas filled th	45	64506	64511	64501	---	---	---	---
	63	64507	64512	64502	---	---	---	---
	100	64508	64513	64503	64456	64457	64463	on request
	150	64509	64514	64504	---	---	---	---
	200	64510	64515	64505	---	---	---	---
Separate weld-in thermowell (with locking screw) for stem up to Ø 8 mm for bimetal th Ø 10 mm for gas filled th	45	---	64516	64520	---	---	---	---
	63	---	64517	64521	---	---	---	---
	100	---	64450	64453	---	64434	64435	on request
	150	---	64518	64522	---	---	---	---
	200	---	64519	64523	---	---	---	---
Stem extension per 100 mm ¹⁾		64524	64525	64526	---	---	64527	---
Thermowell extension per 100 mm ¹⁾		64528	64529	64530	---	---	64531	---
Fixed male connection G ¹ / ₄ B		64532	64533	64534	---	---	---	---
Fixed male connection G ¹ / ₂ B		64447	64451	64454	---	---	64460	---
Fixed male connection G ³ / ₄ B		64535	64536	64537	---	---	64538	---
Loose male connection G ¹ / ₄ B		64539	64540	64541	---	---	---	---
Loose male connection G ¹ / ₂ B		64542	64543	64544	---	---	64545	---
Loose male connection G ³ / ₄ B		64546	64547	64548	---	---	64549	---
Loose union nut G ¹ / ₂ female		64448	64436	64455	---	---	64461	---
Loose union nut G ³ / ₄ female		64551	64552	64553	---	---	64554	---
Loose male connection G ¹ / ₂ B with separate thermowell (100 mm) G ¹ / ₂ B		---	---	---	---	---	---	64462
Compression fitting adjustable G ¹ / ₂ B		---	64555	64556	---	---	64557	---
Compression fitting adjustable G ³ / ₄ B		---	---	64558	---	---	64559	---
Capillary per metre, stainless steel 1.4571		---	---	---	---	---	64464	---
Stem Ø 6 mm ²⁾		---	---	---	---	---	---	---
Stem Ø 4 mm ²⁾		---	---	---	---	---	---	---
Injection tip for Ø 8 mm ²⁾		---	---	---	---	---	---	---
Injection tip for Ø 4 mm ²⁾		---	---	---	---	---	---	---

¹⁾ Only applicable to standard lengths 45/63/100/150/200/250/300/400 mm – additional cost for special lengths

²⁾ Only for centre back connection, limited measuring ranges

Thermowells according to DIN 43772

DG: H

Type	Design 5										Design 6										Design 4									
																														
	d1	d2	E	N	D1	F1	K1	H1	H2	d1	d2	E	N	D1	F2	K1	H1	H2	d1	d2	F2	N	F3	H1	H2					
Dimensions (mm)	10	8	G1/2B	G1/2	26	12	14	19	15	10	8	G1/2B	G1/2	26	17	14	19	15	9	8	26	G1/2	15	19	15					
	11	10	G1/2B	G1/2	26	13	14	19	15	11	10	G1/2B	G1/2	26	17	14	19	15	11	10	26	G1/2	17	19	15					
	d2 = stem diameter of instrument																													
Connection	To thermometer G ¹ / ₂ female, process connection G ¹ / ₂ B																	To thermometer G ¹ / ₂ female												
Version	Several parts, screw-in										One part, screw-in										One part, weld-in									
Material						Brass		Stainless steel								Steel		Stainless steel								Steel		Stainless steel		
P _{max} *						25 bar		40 bar								160 bar		150 bar								160 bar		150 bar		
T _{max} *						160 °C		400 °C								300 °C		400 °C								300 °C		400 °C		
	For stem diameters up to 8 mm																													
	Lengths mm		Price € Part no.		Price € Part no.		Lengths mm		Price € Part no.		Price € Part no.		Lengths mm		Price € Part no.		Price € Part no.		Lengths mm		Price € Part no.		Price € Part no.		Lengths mm		Price € Part no.		Price € Part no.	
	L 110 U1 82 G 105		64670		64674		L 110 U1 82 G 105		64678		64682		L 110 U1 82 G 105		64678		64682		L 110 G 105 U 65		64686		64690		L 110 G 105 U 65		64686		64690	
	L 170 U1 142 G 165		64671		64675		L 170 U1 142 G 165		64679		64683		L 170 U1 142 G 165		64679		64683		L 170 G 165 U 65		64687		64691		L 170 G 165 U 65		64687		64691	
	L 210 U1 182 G 205		64672		64676		L 210 U1 182 G 205		64680		64684		L 210 U1 182 G 205		64680		64684		L 200 G 195 U 65		64688		64692		L 200 G 195 U 65		64688		64692	
	L 260 U1 232 G 255		64673		64677		L 260 U1 232 G 255		64681		64685		L 260 U1 232 G 255		64681		64685		L 260 G 255 U 125		64689		64693		L 260 G 255 U 125		64689		64693	
	For stem diameters up to 10 mm																													
	Lengths mm		Price € Part no.		Price € Part no.		Lengths mm		Price € Part no.		Price € Part no.		Lengths mm		Price € Part no.		Price € Part no.		Lengths mm		Price € Part no.		Price € Part no.		Lengths mm		Price € Part no.		Price € Part no.	
	L 110 U1 82 G 105		64694		64698		L 110 U1 82 G 105		64702		64706		L 110 U1 82 G 105		64702		64706		L 110 G 105 U 65		64710		64714		L 110 G 105 U 65		64710		64714	
	L 170 U1 142 G 165		64695		64699		L 170 U1 142 G 165		64703		64707		L 170 U1 142 G 165		64703		64707		L 170 G 165 U 65		64711		64715		L 170 G 165 U 65		64711		64715	
	L 210 U1 182 G 205		64696		64700		L 210 U1 182 G 205		64704		64708		L 210 U1 182 G 205		64704		64708		L 200 G 195 U 65		64712		64716		L 200 G 195 U 65		64712		64716	
	L 260 U1 232 G 255		64697		64701		L 260 U1 232 G 255		64705		64709		L 260 U1 232 G 255		64705		64709		L 260 G 255 U 125		64713		64717		L 260 G 255 U 125		64713		64717	

* Applicable to static load (load always depends on medium, pressure and temperature of medium, installation length and material of thermowell).

Immersion shaft length of the thermometer (for fixed male connection, G1/2B): L = minus 10 mm.

Additional costs for bimetal and gas filled thermometers (industrial, stainless steel and chemical application versions)

DG: H

	Bimetal thermometers			Gas filled thermometers		
Housing diameter (mm)	< 100	100	160		100	160
	Price € Part no.	Price € Part no.	Price € Part no.		Price € Part no.	Price € Part no.
Red mark on dial	64465	64470	64478		64487	64492
1 reference pointer red, external knob adjustment (front glass = plastic T_{max} 160 °C only for instruments without filling)	64467	64471	64479		64488	64493
Max pointer, external knob adjustment (front glass = plastic T_{max} 160 °C only for instruments without filling)	64468	64473	64481		64489	64494
Glycerine filling (only for instruments with bayonet type bezel housing)		64475	64483		64490	64495
Silicone oil (only for instruments with bayonet type bezel housing)		64476	64484		64491	64496
Other ranges (additional cost with reference to version 0/120 °C)	Minimum stem length back connection (in mm)*		Minimum stem length bottom connection (in mm)*		Price €	
-20/+40 °C	63		100			
-20/+60 °C	63		63			
-30/+50 °C	63		63			
-40/+40 °C	63		63			
-40/+60 °C	63		63			
0/ 60 °C	63		100			
0/ 80 °C	63		63			
0/100 °C	63		63			
0/200 °C	63		63			
0/250 °C	100		100			
0/300 °C	75		63			
0/400 °C	75		75			
0/500 °C	63		63			
0/600 °C	75		175			

* For version with separate thermowell

Electrical contacts (only for gas filled thermometers)

DG: H

Design			Magnetic spring contact		Inductive contact	
Code			MK 1	MK 2	IK 1	IK 2
Number of contacts			1	2	1	2
Switching function: 1 = closes, 2 = opens (pointer moves clockwise)			1 2	11, 12 21, 22	1 2	11, 12 21, 22
The additional costs listed include mounting; gauge not included						
Version	Nominal size	Housing	Price €	Price €	Price €	Price €
gas filled thermometers	100	without filling				
chemical	100	with filling				
application versions	160	without filling				
	160	with filling				

Please refer to page 354 for contact protection relays and isolating amplifiers.

Industrial thermometers



Application

Heating, industry, machine construction

Nominal size

110 x 30 - 150 x 36 - 200 x 36

Upper part

Aluminium, V-shaped, polished, anodised brass-coloured. Numbers of the measuring range on the right scale side below the anodised layer, printed, black. Adjustable by means of brass nut (spanner size 22), so that readings from any angle are possible.

Glass insert (capillary)

Prismatic capillary - completely made from glass, Ø 6 mm. Graduation marks of the capillary burnt in, black, completely resistant. Main graduation marks corresponding to the numbers printed in the housing are especially bold and easy-to-read.

Thermometer filling

Standard version: blue liquid indicating from -60/+200 °C.

Stem

Brass, Ø 10 mm, with fixed thread G¹/₂B.

Stainless steel version on request.



Accuracy

DIN 16195

Ranges °C

-30/50, 0/60, 0/120, 0/160

Mounting position

Straight

Angled 90°

Angled 135°

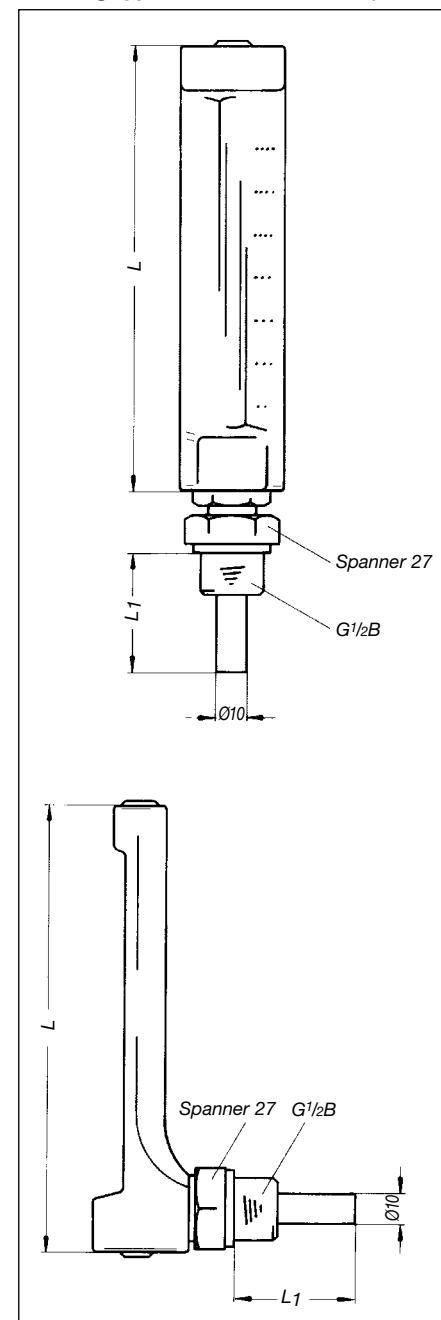
Stem lengths (mm)

40, 63, 100, 160

Options

- Other ranges
- Other stem lengths
- Other stem materials
- Other threads
- Upper part anodised aluminium-coloured
- Upper part made from plastic
- Thermowells

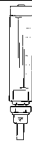
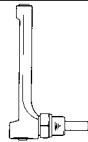
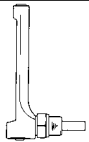
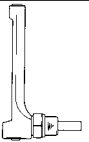
Housing types and dimensions (in mm)



Type	L	L ₁
VMTh 110	110	40
VMTh 150	150	63
VMTh 200	200	100
		160

Industrial thermometers

DG: H

Type	VMTh 110	VMTh 110	VMTh 150	VMTh 150	VMTh 200	VMTh 200
Version						
Nominal size	110 x 30	110 x 30	150 x 36	150 x 36	200 x 36	200 x 36
DIN	16181	16182	16185	16186	16189	16190
Mounting position	Straight	Angled 90°	Straight	Angled 90°	Straight	Angled 90°
Housing	Aluminium, anodised brass-coloured					
Stem	Brass, Ø 10 mm					
Connection	Version B with screw-in socket G ¹ / ₂ B, brass					
Accuracy	According to DIN 16195					
Range	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
40 mm	64101	64120	64136	64150	---	---
63 mm	64102	64121	64137	64151	64165	64181
100 mm	64103	64122	64138	64152	64166	64182
160 mm	64104	64123	64139	64153	64167	64183
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
40 mm	64106	64124	64140	64154	---	---
63 mm	64107	64125	64141	64155	64169	64185
100 mm	64108	64126	64142	64156	64170	64186
160 mm	64109	64127	64143	64157	64171	64187
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
40 mm	64111	64128	64100	64110	---	---
63 mm	64112	64129	64105	64115	64173	64189
100 mm	64113	64130	64144	64158	64174	64190
160 mm	64114	64131	64145	64159	64175	64191
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
40 mm	64116	64132	64146	64160	---	---
63 mm	64117	64133	64147	64161	64177	64193
100 mm	64118	64134	64148	64162	64178	64194
160 mm	64119	64135	64149	64163	64179	64195

Please enquire for angle 135° version.
Additional cost for stainless steel screw-in socket

Thermometers with capillary tube



Type THK 115/40 S

Nominal size

40 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

-40/+40 °C
0/120 °C

Accuracy/test point

-40/+40 °C/-20 °C = ± 2 °C
0/120 °C/ 30 °C = ± 3 °C

Scale

Dial white - numbers black
Dial black - numbers white
Dial black - numbers yellow

Capillary length

L = 500 mm
L = 1,000 mm
L = 1,500 mm
L = 2,000 mm

Bezel

Square bezel, black
Square bezel, white
Square bezel, grey

Option

- Nominal size 37 mm (type THK 113)



Type THK 110/52 S

Nominal size

52 mm

Connection

Capillary tube (refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

-40/+40 °C
0/120 °C

Accuracy/test point

-40/+40 °C/-20 °C = ± 2 °C
0/120 °C/ 30 °C = ± 3 °C

Scale

Dial white - numbers black
Dial black - numbers white
Dial black - numbers yellow

Capillary length

L = 500 mm
L = 1,000 mm
L = 1,500 mm
L = 2,000 mm

Bezel

Crimped bezel, black
Crimped bezel, chrome-plated
Square bezel, black
Square bezel, white
Square bezel, grey



Type THK 130/45 S

Nominal size

45 x 45 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

-40/+40 °C
0/120 °C

Accuracy/test point

-40/+40 °C/-20 °C = ± 2 °C
0/120 °C/ 30 °C = ± 3 °C

Scale

Dial white - numbers black
Dial black - numbers white
Dial black - numbers yellow

Capillary length

L = 500 mm
L = 1,000 mm
L = 1,500 mm
L = 2,000 mm

Bezel

Black
White
Grey

Thermometers with capillary tube

Dimensions (in mm) and capillary connection

Type THK 115/40 S

Range	Capillary	Probe (F)
-40/+40 °C	Cu with PVC coating (R3, white)	Ø 8.5 x 30 Cu
0/120 °C	Cu with PVC coating (R3, grey)	Ø 6.5 x 30 Cu

Type THK 110/52 S

Range	Capillary	Probe (F)
-40/+40 °C	Cu with PVC coating (R3, white)	Ø 8.5 x 30 Cu
0/120 °C	Cu with PVC coating (R3, grey)	Ø 6.5 x 30 Cu

Type THK 130/45 S

Range	Capillary	Probe (F)
-40/+40 °C	Cu with PVC coating (R3, white)	Ø 8.5 x 30 Cu
0/120 °C	Cu with PVC coating (R3, grey)	Ø 6.5 x 30 Cu

Thermometers with capillary tube



Type THK 150/58 S

Nominal size

58 x 25 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

Printed on inner side of front glass

Housing

ABS, black

Front glass

Plastic

Ranges

-40/+40 °C
0/120 °C

Accuracy/test point

-40/+40 °C/-20 °C = ± 2 °C
0/120 °C/ 30 °C = ± 3 °C

Scale

Dial white - numbers black
Dial black - numbers white
Dial black - numbers yellow

Capillary length

L = 500 mm
L = 1,000 mm
L = 1,500 mm
L = 2,000 mm

Bezel

Black
White
Grey

Option

- Vertical mounting position



Type THK 171/62 S

Nominal size

62 x 11 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

Printed on inner side of front glass

Housing

ABS, black

Front glass

Plastic

Ranges

-40/+40 °C
0/120 °C

Accuracy/test point

-40/+40 °C/-20 °C = ± 2 °C
0/120 °C/ 30 °C = ± 3 °C

Scale

Dial white - numbers black
Dial black - numbers white
Dial black - numbers yellow

Capillary length

L = 500 mm
L = 1,000 mm
L = 1,500 mm
L = 2,000 mm

Bezel

Black
White
Grey

Option

- Vertical mounting position



Type THK 181/62 S

Nominal size

62 x 11 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

Printed on inner side of front glass

Housing

ABS, black

Front glass

Plastic

Ranges

-40/+40 °C
0/120 °C

Accuracy/test point

-40/+40 °C/-20 °C = ± 2 °C
0/120 °C/ 30 °C = ± 3 °C

Scale

Dial white - numbers black
Dial black - numbers white
Dial black - numbers yellow

Capillary length

L = 500 mm
L = 1,000 mm
L = 1,500 mm
L = 2,000 mm

Bezel

Black
White
Grey

Option

- Vertical mounting position

Thermometers with capillary tube

Dimensions (in mm) and capillary connection

Type THK 150/58 S

Range	Capillary	Probe (F)
-40/+40 °C	Cu with PVC coating (R3, white)	Ø 8.5 x 30 Cu
0/120 °C	Cu with PVC coating (R3, gray)	Ø 6.5 x 30 Cu

Type THK 171/62 S

Range	Capillary	Probe (F)
-40/+40 °C	Cu with PVC coating (R3, white)	Ø 8.5 x 30 Cu
0/120 °C	Cu with PVC coating (R3, grey)	Ø 6.5 x 25 Cu

Type THK 181/62 S

Range	Capillary	Probe (F)
-40/+40 °C	Cu with PVC coating (R3, white)	Ø 8.5 x 30 Cu
0/120 °C	Cu with PVC coating (R3, grey)	Ø 6.5 x 25 Cu

Pressure gauges with capillary tube



Type RFK 360/40 S

Nominal size

40 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

0/4 bar

0/6 bar

Accuracy/test point

0/4 bar/1 bar = ± 0.2 bar

0/6 bar/1 bar = ± 0.2 bar

Scale

Dial white - numbers black

Dial black - numbers white

Dial black - numbers yellow

Capillary length

L = 500 mm

L = 1,000 mm

L = 1,500 mm

L = 2,000 mm

Bezel

Square bezel, black

Square bezel, white

Square bezel, grey

Option

- Nominal size 37 mm (type RFK 323)



Type RFK 320/52 S

Nominal size

52 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

0/4 bar

0/6 bar

Accuracy/test point

0/4 bar/1 bar = ± 0.2 bar

0/6 bar/1 bar = ± 0.2 bar

Scale

Dial white - numbers black

Dial black - numbers white

Dial black - numbers yellow

Capillary length

L = 500 mm

L = 1,000 mm

L = 1,500 mm

L = 2,000 mm

Bezel

Crimped bezel, black

Crimped bezel, chrome-plated

Square bezel, black

Square bezel, white



Type RFK 340/45 S

Nominal size

45 x 45 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

0/4 bar

0/6 bar

Accuracy/test point

0/4 bar/1 bar = ± 0.2 bar

0/6 bar/1 bar = ± 0.2 bar

Scale

Dial white - numbers black

Dial black - numbers white

Dial black - numbers yellow

Capillary length

L = 500 mm

L = 1,000 mm

L = 1,500 mm

L = 2,000 mm

Bezel

Black

White

Grey

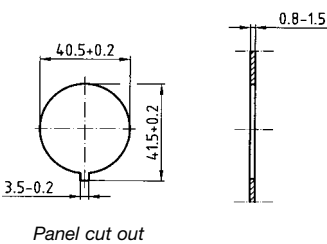
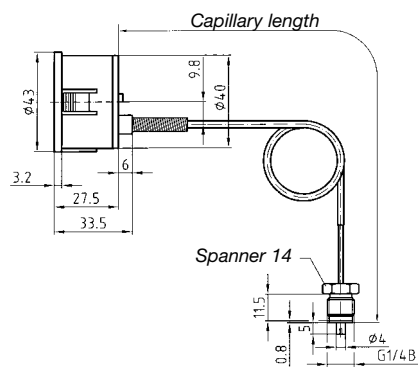
Option

- Nominal size 37 mm (type RFK 343)

Pressure gauges with capillary tube

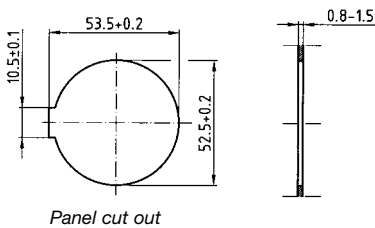
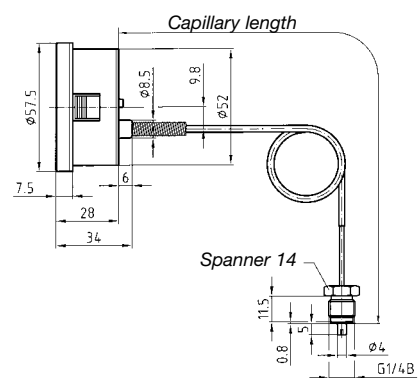
Dimensions (in mm) and capillary connection

Type RFK 360/40 S



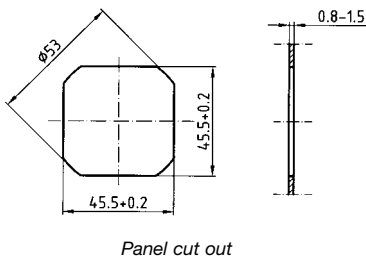
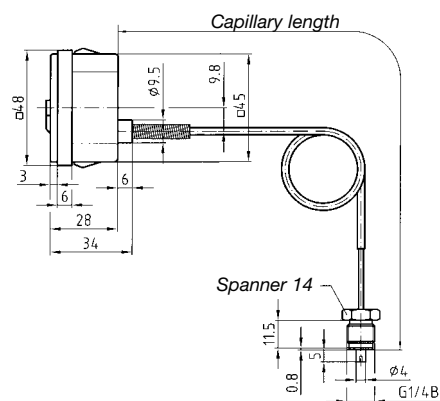
Capillary
Cu with PVC coating (R3, grey)

Type RFK 320/52 S



Capillary
Cu with PVC coating (R3, grey)

Type RFK 340/45 S



Capillary
Cu with PVC coating (R3, grey)

Combination thermometer/pressure gauges with capillary tube



Type THMK 560/40 S

Nominal size

40 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

0/120 °C – 0/4 bar

0/120 °C – 0/6 bar

Accuracy/test point

0/4 bar /1 bar = ± 0.2 bar

0/6 bar /1 bar = ± 0.2 bar

0/120 °C/30 °C = ± 3 °C

Scale

Dial white - numbers black

Dial black - numbers white

Dial black - numbers yellow

Capillary length

L = 500 mm

L = 1,000 mm

L = 1,500 mm

L = 2,000 mm

Bezel

Crimped bezel, black

Crimped bezel, chrome-plated

Square bezel, black

Square bezel, white

Square bezel, grey



Type THMK 520/52 S

Nominal size

52 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

0/120 °C – 0/4 bar

0/120 °C – 0/6 bar

Accuracy/test point

0/4 bar /1 bar = ± 0.2 bar

0/6 bar /1 bar = ± 0.2 bar

0/120 °C/30 °C = ± 3 °C

Scale

Dial white - numbers black

Dial black - numbers white

Dial black - numbers yellow

Capillary length

L = 500 mm

L = 1,000 mm

L = 1,500 mm

L = 2,000 mm

Bezel

Crimped bezel, black

Crimped bezel, chrome-plated

Square bezel, black

Square bezel, white

Square bezel, grey



Type THMK 540/73 S

Nominal size

73 x 37 mm

Connection

Capillary tube
(refer to dimension table)

Movement

Brass

Dial

ABS

Pointer

ABS

Housing

ABS, black

Front glass

Plastic

Ranges

0/120 °C – 0/4 bar

0/120 °C – 0/6 bar

Accuracy/test point

0/4 bar /1 bar = ± 0.2 bar

0/6 bar /1 bar = ± 0.2 bar

0/120 °C/ 30 °C = ± 3 °C

Scale

Dial white - numbers black

Dial black - numbers white

Dial grey - numbers black

Capillary length

L = 500 mm

L = 1,000 mm

L = 1,500 mm

L = 2,000 mm

Bezel

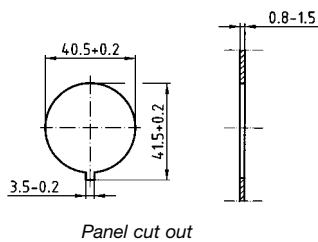
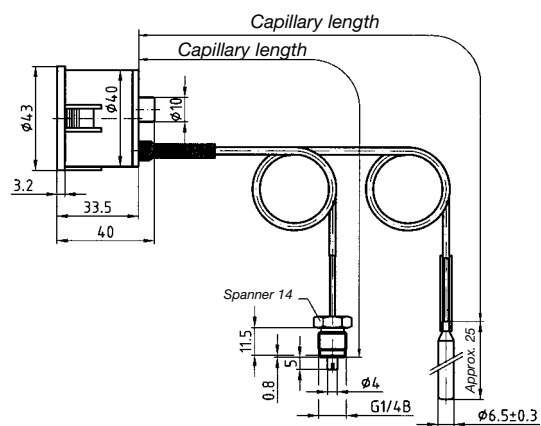
Black

White

Grey

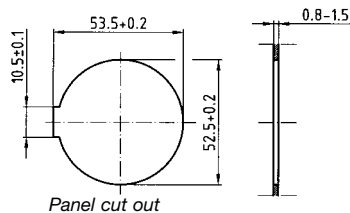
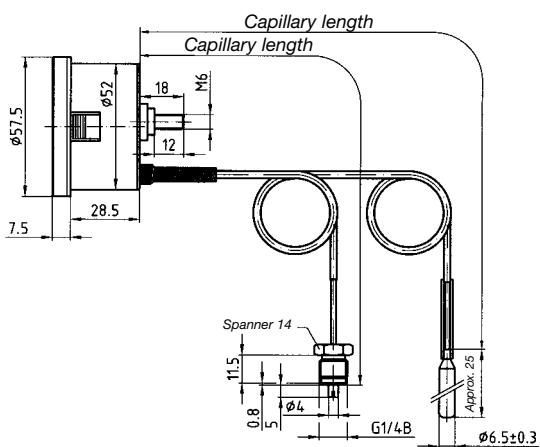
with capillary tube **Dimensions (in mm) and capillary connection**

Type THMK 560/40 S



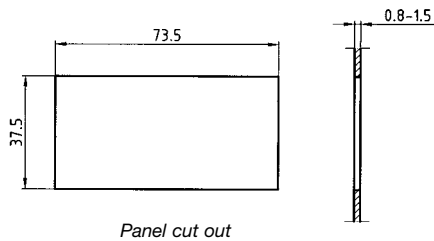
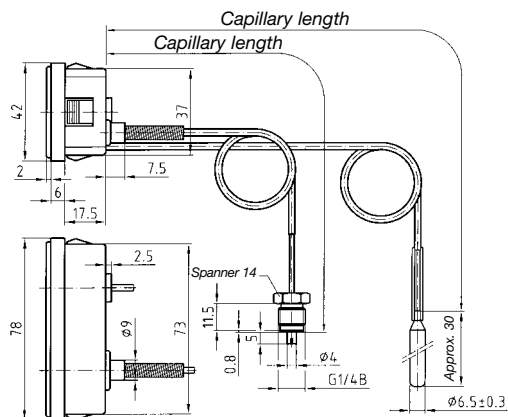
Capillary
<i>Cu with PVC coating (R3, grey)</i>

Type THMK 520/52 S



Capillary
<i>Cu with PVC coating (R3, grey)</i>

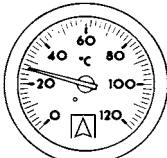
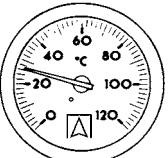
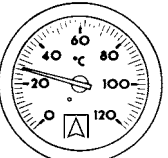
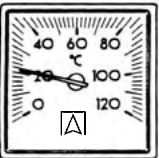
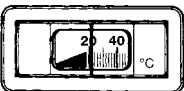
Type THMK 540/73 S



Capillary
<i>Cu with PVC coating (R3, grey)</i>

Thermometers with capillary tube

DG: G

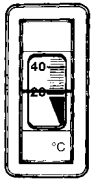
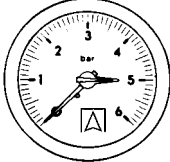
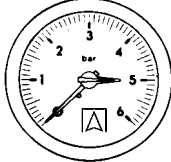
Type	THK 113/37 S	THK 115/40 S	THK 110/52 S	THK 130/45 S	THK 150/58 S
Version					
Housing-Ø	37 mm	40 mm	52 mm	45 x 45 mm	58 x 25 mm
Housing	Plastic, black				
Scale	Dial black - numbers white				
Packing unit*	50 pieces	50 pieces	50 pieces	50 pieces	50 pieces
Range	-40/+40 °C	-40/+40 °C	-40/+40 °C	-40/+40 °C	-40/+40 °C
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
1,000 mm	67510115	67650115	67500115	67520115	67540115
1,500 mm	67510125	67650125	67500125	67520125	67540125
2,000 mm	67510135	67650135	67500135	67520135	67540135
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
1,000 mm	67512115	67652115	67502115	67522115	67542115
1,500 mm	67512125	67652125	67502125	67522125	67542125
2,000 mm	67512135	67652135	67502135	67522135	67542135

Other capillary lengths on request.

* Minimum order quantity for non-stock items = 100 pieces

Thermometers/pressure gauges with capillary tube

DG: G

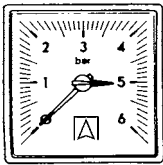
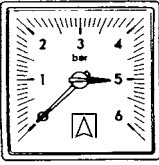
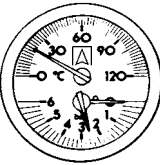
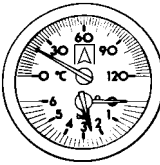
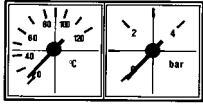
Type	THK 150 S/58 S	THK 171/62 S	THK 181/62 S	RFK 360/40 S	RFK 320/52 S
Version					
Housing-Ø	25 x 58 mm	62 x 11 mm	62 x 11 mm	40 mm	52 mm
Housing	Plastic, black				
Scale	Dial black - numbers white				
Packing unit*	50 Stück	50 pieces	50 pieces	50 pieces	50 pieces
Range	-40/+40 °C	-40/+40 °C	-40/+40 °C	0/4 bar	0/4 bar
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
1,000 mm	67540115s	67560115	67580115	67665115	67595115
1,500 mm	67540125s	67560125	67580125	67665125	67595125
2,000 mm	67540135s	67560135	67580135	67665135	67595135
Range	0/120 °C	0/120 °C	0/120 °C	0/6 bar	0/6 bar
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
1,000 mm	67542115s	67562115	67582115	67666115	67596115
1,500 mm	67542125s	67562125	67582125	67666125	67596125
2,000 mm	67542135s	67562135	67582135	67666135	67596135

Other capillary lengths on request.

* Minimum order quantity for non-stock items = 100 pieces

Combination thermometer/pressure gauges with capillary tube

DG: G

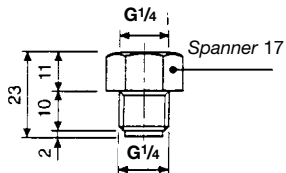
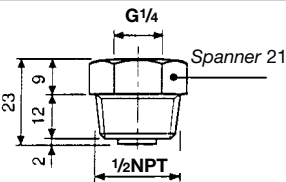
Type	RFK 340/45 S	RFK 343/37 S	THMK 560/40 S	THMK 520/52 S	THMK 540/73 S
Version					
Housing-Ø	45 x 45 mm	37 mm	40 mm	52 mm	73 x 37 mm
Housing	Plastic, black				
Scale	Dial black - numbers white				
Packing unit*	50 pieces	50 pieces	50 pieces	50 pieces	40 pieces
Range	0/4 bar	0/4 bar	0/120 °C 0/4 bar	0/120 °C 0/4 bar	0/120 °C 0/4 bar
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
1,000 mm	67615115	67625115	67675115	67635115	67645115
1,500 mm	67615125	67625125	67675125	67635125	67645125
2,000 mm	67615135	67625135	67675135	67635135	67645135
Range	0/6 bar	0/6 bar	0/120 °C 0/6 bar	0/120 °C 0/6 bar	0/120 °C 0/6 bar
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
1,000 mm	67616115	67626115	67676115	67636115	67646115
1,500 mm	67616125	67626125	67676125	67636125	67646125
2,000 mm	67616135	67626135	67676135	67636135	67646135

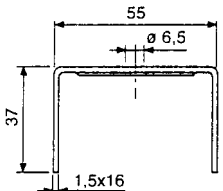
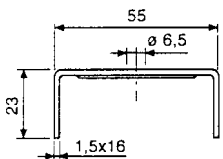
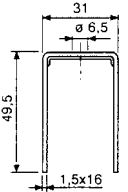
Other capillary lengths on request.

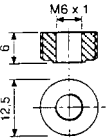
* Minimum order quantity for non-stock items = 100 pieces

Accessories for pressure gauges and thermometers with capillary tube

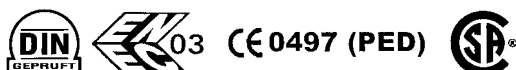
DG: G

Mounting valve						
	Packing unit*	Part no.	Female	Male	Material	Price €
	50 pieces	67960	G $\frac{1}{4}$	G $\frac{1}{4}$ B	Brass	
	50 pieces	67961	G $\frac{1}{4}$	$\frac{1}{2}$ NPT	Brass	

Fixing bracket						
	Packing unit*	Part no.	Width	Height	Material	Price €
	50 pieces	67965 (Suitable for THMK 520)	55 mm	37 mm	Sheet steel, black	
	50 pieces	67966 (Suitable for THK 110)	55 mm	23 mm	Sheet steel, black	
	50 pieces	67967 (Suitable for THK 150)	31 mm	49,5 mm	Sheet steel, black	

Knurled nut						
	Packing unit*	Part no.	Thread	Height	Material	Price €
	50 pieces	67968	M 6 x 1	6 mm	Plastic	

Thermostats TRT 200



Type TRT 200/711

Operating range
0/90 °C

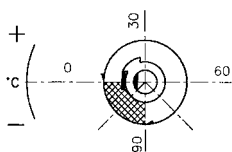
Tolerance
 $T_{min} \pm 5 \text{ K} - T_{max} \pm 3 \text{ K}$

Switching differential
 $3 \pm 1 \text{ K}$

Probe element
Liquid-filled
 $T_{max} = 120 \text{ °C}$

Time constant
DIN 3440

Adjustment angle
270 °

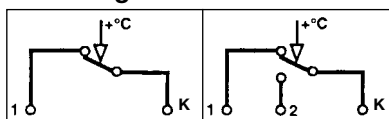


Housing protection
IP 00

Capillary tube coating
PVC R3, black

Contact rating
K1 16 (4)A 250V AC
K1-2 6 (1)A 400V AC

Switching schematic



Accessories
2 screws M 4x6

Options

- Other operating ranges
- Other capillary lengths
- Temperature compensation
- Gas-filled probe element

Refer to page 203 for part no.



Type TRT 200/712

Operating range
0/90 °C

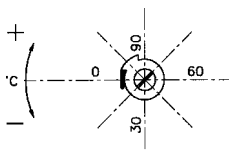
Tolerance
 $T_{min} \pm 5 \text{ K} - T_{max} \pm 3 \text{ K}$

Switching differential
 $3 \pm 1 \text{ K}$

Probe element
Liquid-filled
 $T_{max} = 120 \text{ °C}$

Time constant
DIN 3440

Adjustment angle
270 °

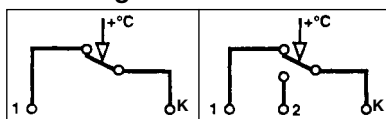


Housing protection
IP 00

Capillary tube coating
PVC R3, black

Contact rating
K1 16 (4)A 250V AC
K1-2 6 (1)A 400V AC

Switching schematic



Accessories
2 screws M 4x6

Options

- Other operating ranges
- Other capillary lengths
- Temperature compensation
- Gas-filled probe element



Type TRT 200/716

Switch point
Between 30 and 100 °C as required, factory-preset

Switch point accuracy
 $\pm 3 \text{ K}$

Switching differential
 $3 \pm 1 \text{ K}$

Probe element
Liquid-filled
 $T_{max} = 120 \text{ °C}$

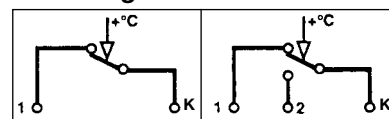
Time constant
DIN 3440

Housing protection
IP 00

Capillary tube coating
PVC R3, black

Contact rating
K1 16 (4)A 250V AC
K1-2 6 (1)A 400V AC

Switching schematic



Accessories
2 screws M 4x6

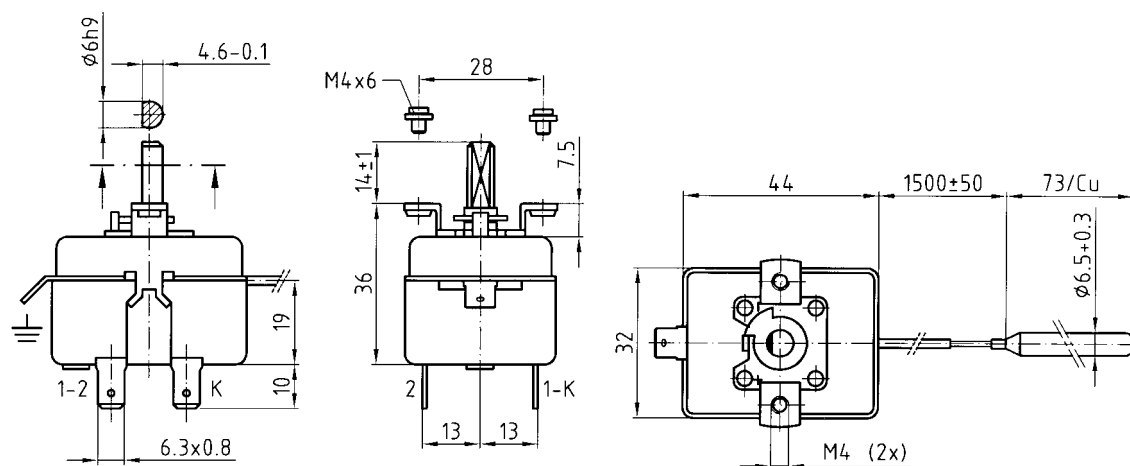
Options

- Other capillary lengths
- Temperature compensation
- Gas-filled probe element

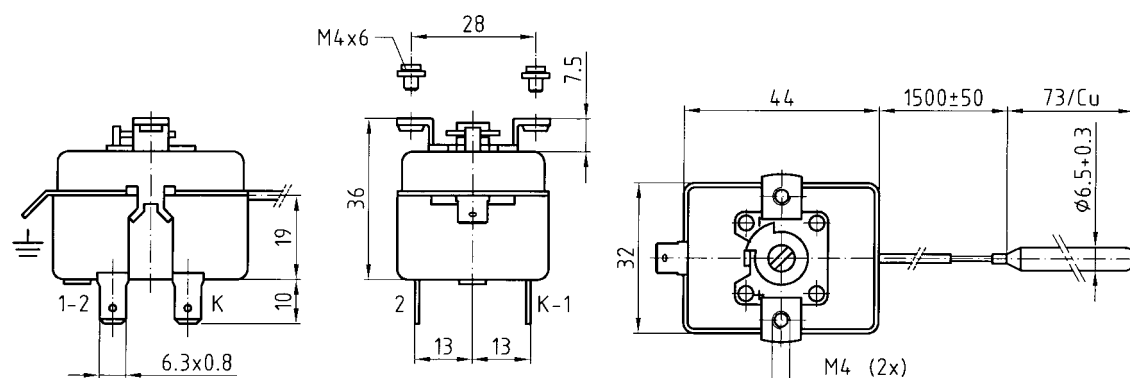
Thermostats TRT 200

Dimensions (in mm) and capillary connection

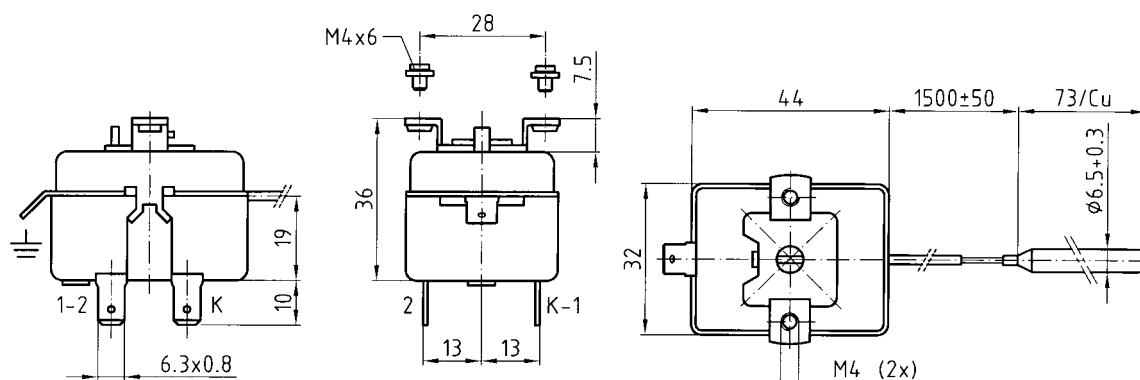
Type TRT 200/711 0/90 °C



Type TRT 200/712 0/90 °C



Type TRT 200/716 30/100 °C



Safety temperature switches



03 (CE 0497 (PED))



Type STB 400/971

Function

Liquid filled temperature switch with manual reset.

Switch point

100 °C - factory pre-set
(other switch points on request)

Switch point accuracy

+0/-6 K

Reset differential

20 ±5 K

Probe element

Liquid-filled
 $T_{max} = 135\text{ °C}$

Time constant

DIN 3440

Housing protection

IP 00

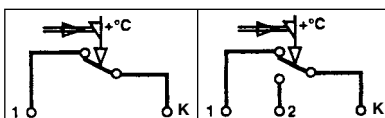
Capillary tube coating

PVC R3, black

Contact rating

K1 16 (4)A 250V AC
K1-2 6 (1)A 400V AC

Switching schematic



Accessories

Protective cover plastic, black
Fastening nut M10 x 1

Options

- Other switch points
- Other capillary lengths
- Gold-plated
- Temperature compensation

Refer to page 204 for part no.



Type ETB 400/961

Function

Adjustable liquid filled temperature switch with manual reset.

Operating range

90/110 °C - adjustable

Calibration point

110 °C

Switch point accuracy

+0/-6 K

Reset differential

20 ±5 K

Probe element

Liquid-filled
 $T_{max} = 135\text{ °C}$

Time constant

DIN 3440

Housing protection

IP 00

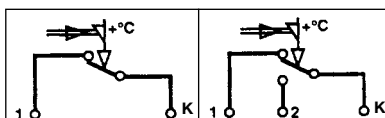
Capillary tube coating

PVC R3, black

Contact rating

K1 16 (4)A 250V AC
K1-2 6 (1)A 400V AC

Switching schematic



Accessories

Protective cover plastic, black
Fastening nut M10 x 1

Options

- Other capillary lengths
- Gold-plated
- Temperature compensation



Type STW 400/972

Function

Pre-adjusted liquid filled temperature switch with automatic reset.

Switch point

100 °C - factory pre-set
(other switch points on request)

Switch point accuracy

+0/-6 K

Switching differential

10 to 15 K

Probe element

Liquid-filled
 $T_{max} = 135\text{ °C}$

Time constant

DIN 3440

Housing protection

IP 00

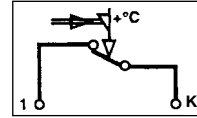
Capillary tube coating

PVC R3, black

Contact rating

K1 16 (4)A 250V AC

Switching schematic



Accessories

2 screws M4 x 6

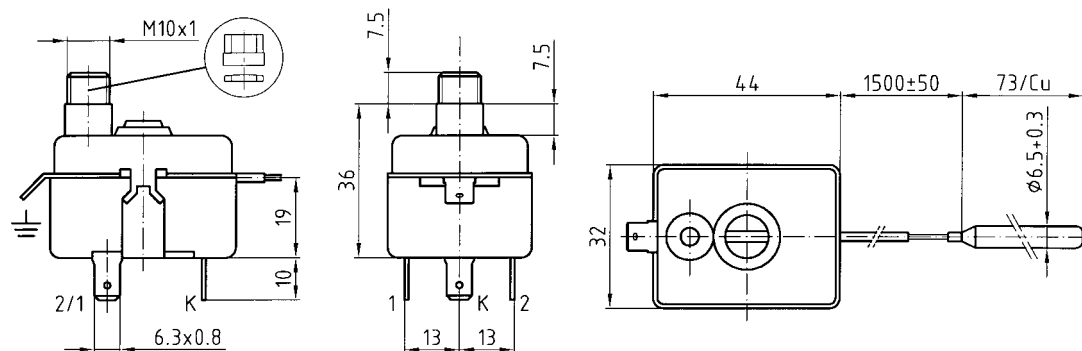
Options

- Other switch points
- Other capillary lengths
- Gold-plated
- Temperature compensation

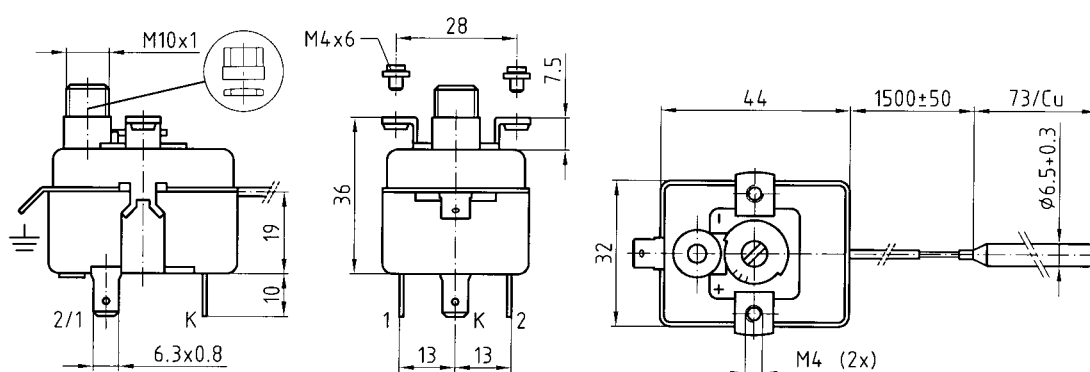
Safety temperature switches

Dimensions (in mm) and capillary connection

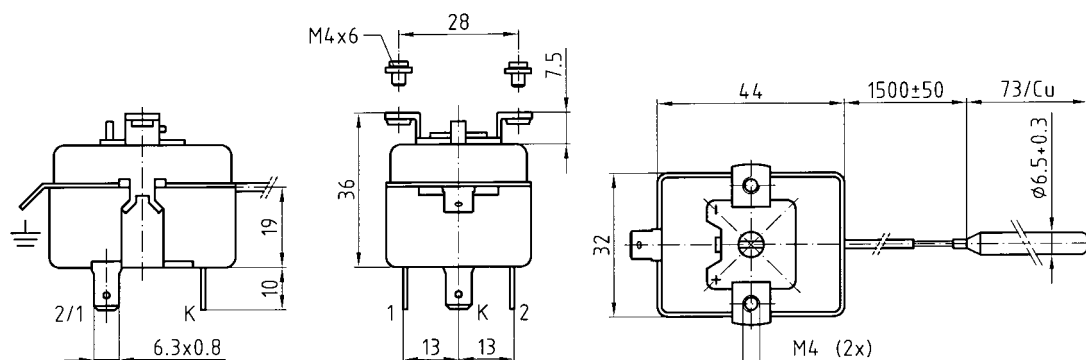
Type STB 400/971 100 °C



Type ETB 400/961 90/110 °C

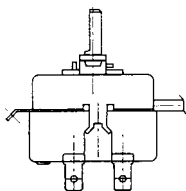
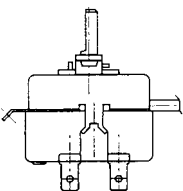
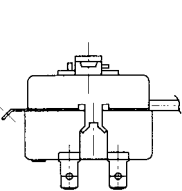
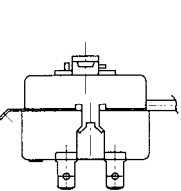
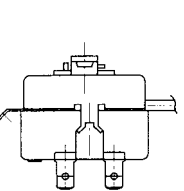
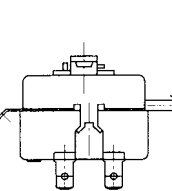


Type STW 400/972 100 °C

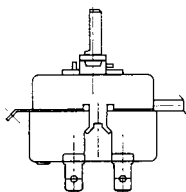
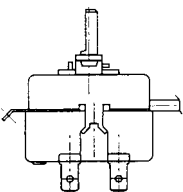
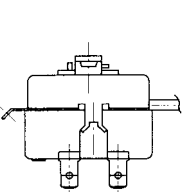
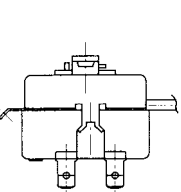
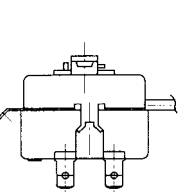
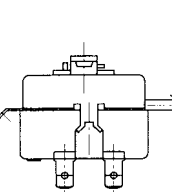


Thermostats TRT 200

DG: G

Type	TRT 200/711 EU	TRT 200/711 E1	TRT 200/712 EU	TRT 200/712 E1	TRT 200/716 FU	TRT 200/716 F1
Version						
Contact type	Changeover contact	Single contact	Changeover contact	Single contact	Changeover contact	Single contact
	Adjustable		Adjustable		Factory pre-set	
			Adjustment spindle slotted			
Packing unit*	50 pieces					
Operating range/ switch point	0/90 °C	0/90 °C	0/90 °C	0/90 °C	30/100 °C	30/100 °C
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
500 mm	67215	67212	67245	67242	67251	67248
1,000 mm	67216	67213	67246	67243	67252	67249
1,500 mm	67217	67214	67247	67244	67253	67250

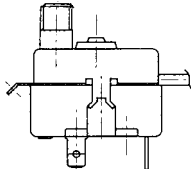
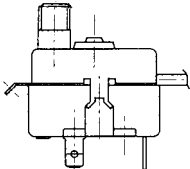
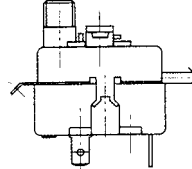
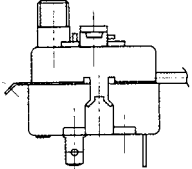
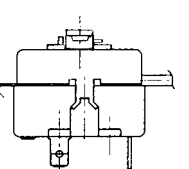
TRT 200 Z - probe element gas-filled

Type	TRT 200 Z/721 EU	TRT 200 Z/721 E1	TRT 200 Z/722 EU	TRT 200 Z/722 E1	TRT 200 Z/726 FU	TRT 200 Z/726 F1
Version						
Contact type	Changeover contact	Single contact	Changeover contact	Single contact	Changeover contact	Single contact
	Adjustable		Adjustable		Factory pre-set	
			Adjustment spindle slotted			
Packing unit*	50 pieces					
Operating range/ switch point	30/90 °C	30/90 °C	30/90 °C	30/90 °C	40/90 °C	40/90 °C
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
500 mm	67257	67254	67263	67260	67269	67266
1,000 mm	67258	67255	67264	67261	67270	67267
1,500 mm	67259	67256	67265	67262	67271	67268

* Minimum order quantity for non-stock items = 100 pieces

Safety temperature switches

DG: G

Type	STB 400/971 FU	STB 400/971 F1	ETB 400/961 EU	ETB 400/961 E1	STW 400/972 F1
Version					
Contact type	Changeover contact	Single contact	Changeover contact	Single contact	Single contact
	Factory pre-set		Adjustable		Factory pre-set
Packing unit*	50 pieces				
Operating range/ switch point	100 °C	100 °C	90/110 °C	90/110 °C	100 °C
Capillary length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
500 mm	67275	67272	67281	67278	67284
1,000 mm	67276	67273	67282	67279	67285
1,500 mm	67277	67274	67283	67280	67286

Accessories

DG: G

Description	Part no.*	Price €
Knob 42 mm for TRT 200, -35/+35 °C	67339	
Knob 42 mm for TRT 200, 0/+40 °C	67340	
Knob 42 mm for TRT 200, 0/+90 °C	67341	
Knob 42 mm for TRT 200, +40/+90 °C	67342	
Knob 42 mm for TRT 200, 0/+120 °C	67343	
Knob 42 mm for TRT 200, 0/+210 °C	67344	
Knob 42 mm for TRT 200, 0/+300 °C	67345	
Bezel for TRT 200, black	67346	
Bezel for TRT 200, chrome plated	67347	
Fixing clamp	67348	
Stop pin	67349	
Threaded stop pin	67350	

* Minimum order quantity for non-stock items = 100 pieces

Surface mounting thermostats with housing GAT/GSA



Type GAT/7RC

Surface mounting thermostat with housing for strap-mounting on pipes, adjustable from outside. Specially suitable for underfloor heating systems.

Operating ranges

0/60 °C
0/90 °C

Tolerance

$T_{min} \pm 5 \text{ K} - T_{max} \pm 5 \text{ K}$

Switching differential

8 K $\pm 2 \text{ K}$

Probe element

Bimetal

Housing

Base plate galvanised sheet steel

Upper part and adjustment knob

ABS (UL 94 V0)

Housing protection

IP 40

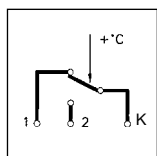
Electrical connections

Cable gland PG 11

Contact rating

K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



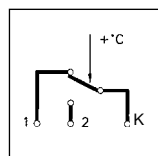
Approvals



CE 0497 (PED)



CE 0497 (PED)



Approvals



CE 0497 (PED)



Housing protection

IP 40

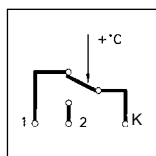
Electrical connections

Cable gland PG 11

Contact rating

K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



Approvals



CE 0497 (PED)



Type GSA/9SC

Adjustable surface mounting thermostat with housing for strap-mounting on pipes, adjustable from inside. With manual reset. Specially suitable for underfloor heating systems.

Operating range

30/70 °C - adjustable

Switch point accuracy

+0/-6 K

Reset differential

20 $\pm 5 \text{ K}$

Probe element

Liquid-filled

Housing

Base plate galvanised sheet steel
Upper part ABS (UL 94 V0)

Housing protection

IP 40

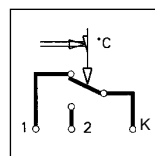
Electrical connections

Cable gland PG 11

Contact rating

K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



Approvals

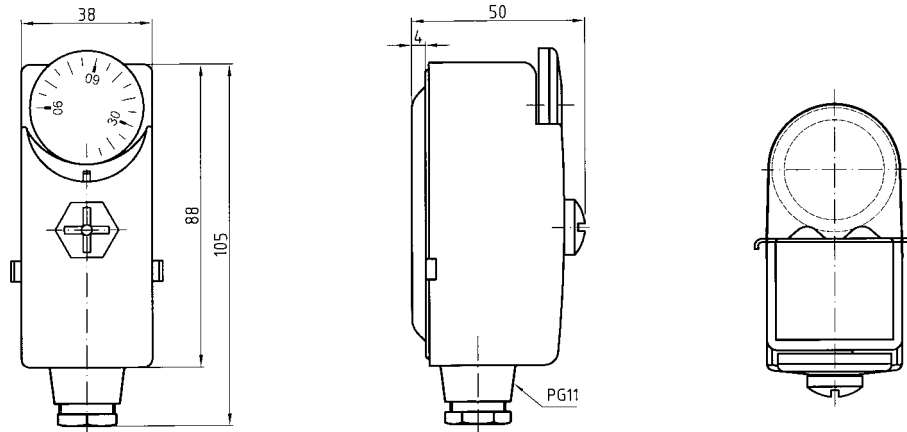


CE 0497 (PED)

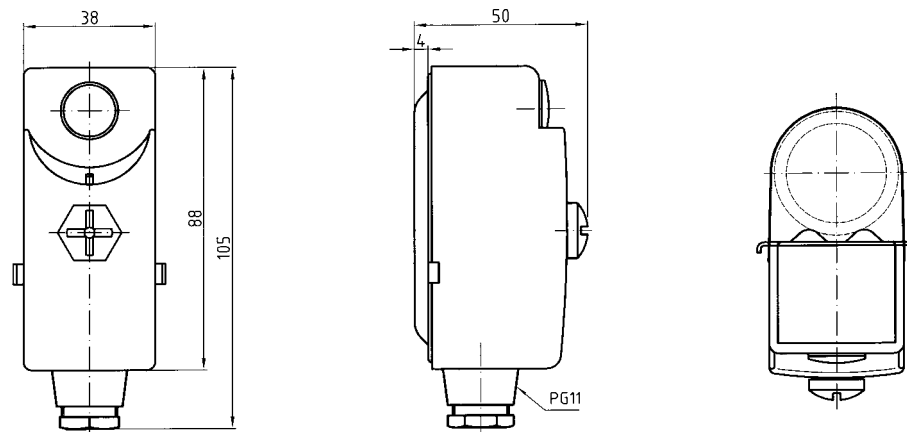


Surface mounting thermostats with housing GAT/GSA *Dimensions (in mm)*

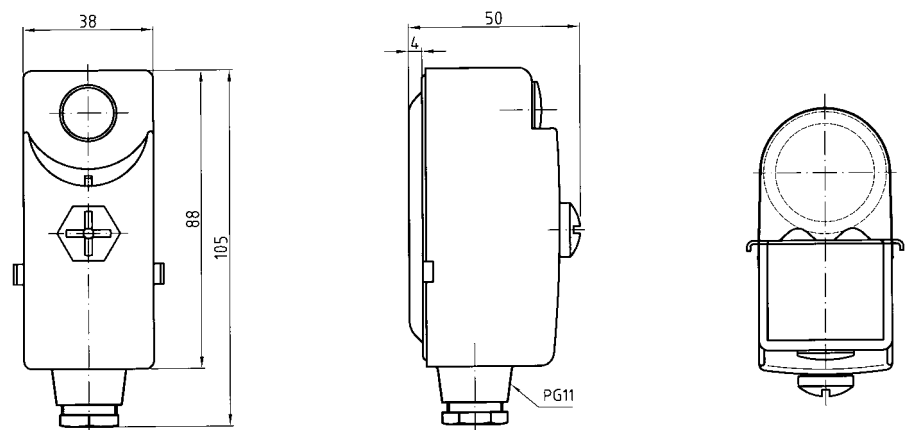
Type GAT/7RC



Type GAT/7HC



Type GSA/9SC



Immersion thermostats with housing GTT/GST



Type GTT/7RG

Immersion thermostat with housing, with immersion stem and pocket, adjustable from outside.

Operating ranges

0/60 °C
0/90 °C

Tolerance

$T_{min} \pm 5 \text{ K} - T_{max} \pm 3 \text{ K}$

Switching differential

5 K $\pm 1 \text{ K}$

Probe element

Liquid-filled

Pocket

Cu alloy, connection 1/2-14 NPT

Stem lengths

100, 150, 200 mm

Housing

Base plate galvanised sheet steel
Upper part and adjustment knob
ABS (UL 94 V0)

Housing protection

IP 40

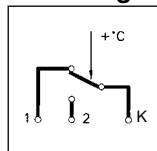
Electrical connections

Cable gland PG 11

Contact rating

K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



Approvals



CE 0497 (PED)



Type GTT/7HG

Immersion thermostat with housing, with immersion stem and pocket, adjustable from inside.

Operating ranges

0/60 °C
0/90 °C

Tolerance

$T_{min} \pm 5 \text{ K} - T_{max} \pm 3 \text{ K}$

Switching differential

5 K $\pm 1 \text{ K}$

Probe element

Liquid-filled

Pocket

Cu alloy, connection 1/2-14 NPT

Stem lengths

100, 150, 200 mm

Housing

Base plate galvanised sheet steel
Upper part ABS (UL 94 V0)

Housing protection

IP 40

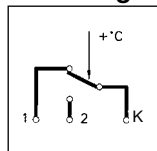
Electrical connections

Cable gland PG 11

Contact rating

K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



Approvals



CE 0497 (PED)



Type GST/9SG

Immersion thermostat with housing, with immersion stem and pocket. With manual reset.

Switch point

100 °C - factory pre-set
(other switch points on request)

Switch point accuracy

+0/-6 K

Reset differential

20 $\pm 5 \text{ K}$

Probe element

Liquid-filled

Pocket

Cu alloy, connection 1/2-14 NPT

Stem length

100 mm

Housing

Base plate galvanised sheet steel
Upper part ABS (UL 94 V0)

Housing protection

IP 40

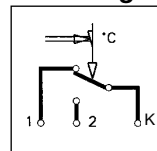
Electrical connections

Cable gland PG 11

Contact rating

K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



Approvals



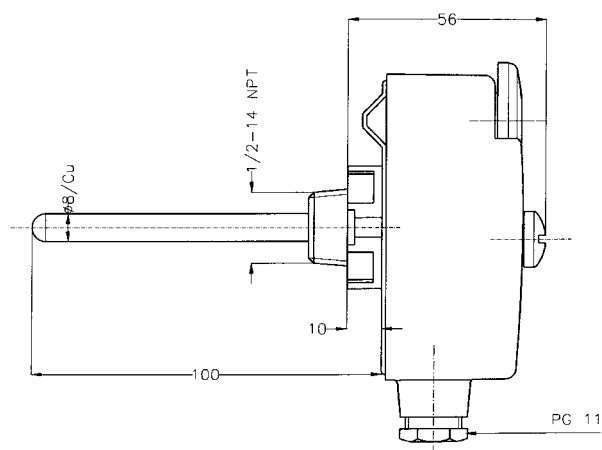
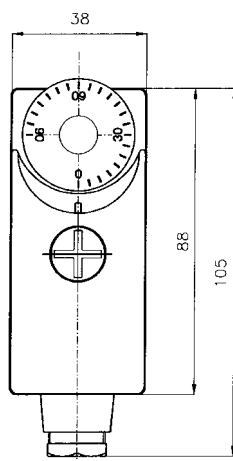
CE 0497 (PED)



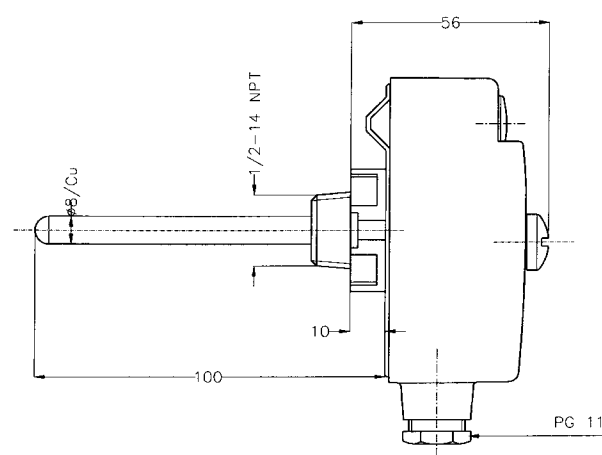
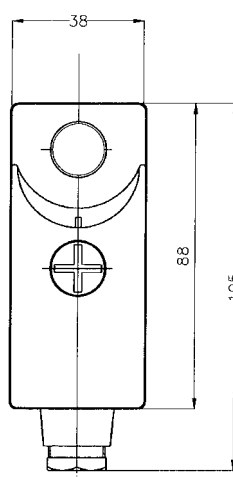
Immersion thermostats with housing GTT/GST

Dimensions (in mm)

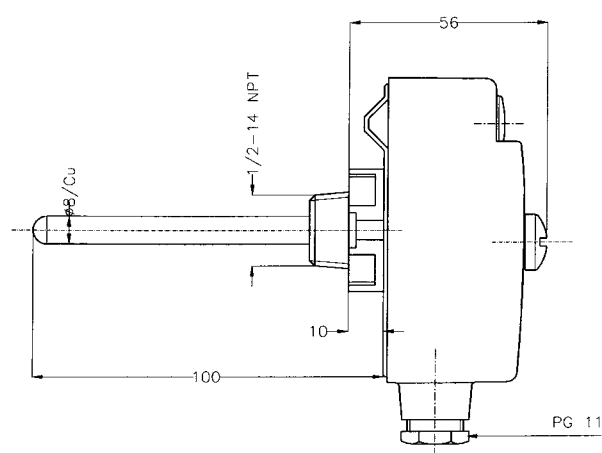
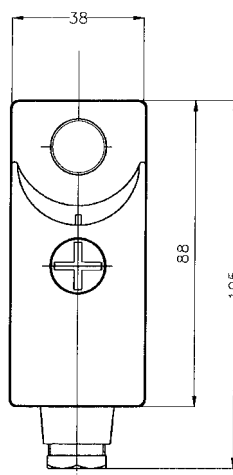
Type GTT/7RG



Type GTT/7HG



Type GST/9SG



Capillary type thermostats with housing GTK/GSK

Room thermostat with housing GRT



CE 0497 (PED)



Type GTK/7RD

Capillary type thermostat with housing, adjustable from outside.

Operating ranges

-35/+35 °C, 0/60 °C, 0/90 °C

Tolerance

-35/+35 °C: $T_{min} \pm 3 \text{ K} - T_{max} \pm 3 \text{ K}$
0/60 and 0/90 °C: $T_{min} \pm 5 \text{ K} - T_{max} \pm 3 \text{ K}$

Switching differential

-35/+35 °C: $2 \text{ K} \pm 1 \text{ K}$
0/60 and 0/90 °C: $5 \text{ K} \pm 1 \text{ K}$

Capillary length

1,000, 1,500 mm

Probe element

Cu alloy/Ø 6,5 x 73 mm, liquid-filled

Housing

Galvanised sheet steel base plate, with 2 holes Ø 4.2 for wall mounting
Upper part and adjustment knob ABS (UL 94 V0)

Housing protection

IP 40

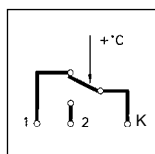
Electrical connections

Cable gland PG 11

Contact rating

K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



Options

- Manual reset, switch point 100 °C (type GSK/9SD)



Type GSK/9SF

Capillary type safety thermostat with housing, adjustable from inside. With manual reset. Specially designed for flue gas monitoring.

Switch point

70/110 °C - adjustable

Switch point accuracy

+0/-8 K

Switching differential

20 ±5 K

Capillary length

1,500 mm

Probe element

Cu alloy/Ø 5 x 90 mm, liquid-filled, $T_{max} 180 \text{ °C}$

Housing

Galvanised sheet steel base plate, with 2 holes Ø 4.2 for wall mounting
Upper part ABS (UL 94 V0)

Housing protection

IP 40

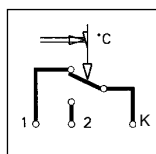
Electrical connections

Cable gland PG 11

Contact rating

Gold contacts
100 mV DC 0.3 A

Switching schematic



Type GRT/7RT

Room thermostat with housing for applications in greenhouses, humid rooms and for animal breeding, adjustable from outside.

Operating ranges

0/40 °C
0/60 °C

Tolerance

$T_{min} \pm 5 \text{ K} - T_{max} \pm 3 \text{ K}$

Switching differential

2 K ±1 K

Probe element

Liquid-filled

Housing

PVC, grey

Housing protection

IP 55

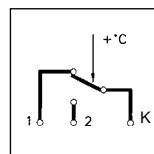
Electrical connections

Cable gland PG 11

Contact rating

K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



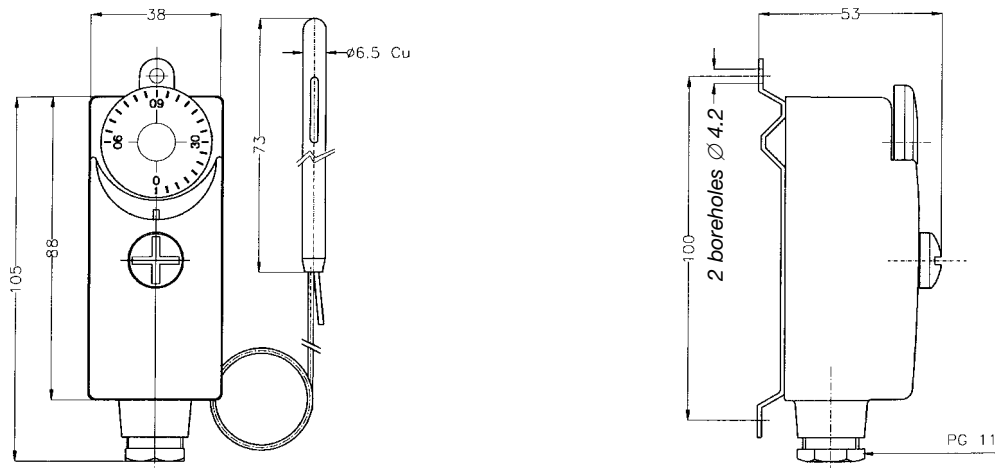
Options

- Adjustable from inside (type 7HT)
- With capillary, adjustable from outside (type 7WD)
- With capillary, adjustable from inside (type 7KD)

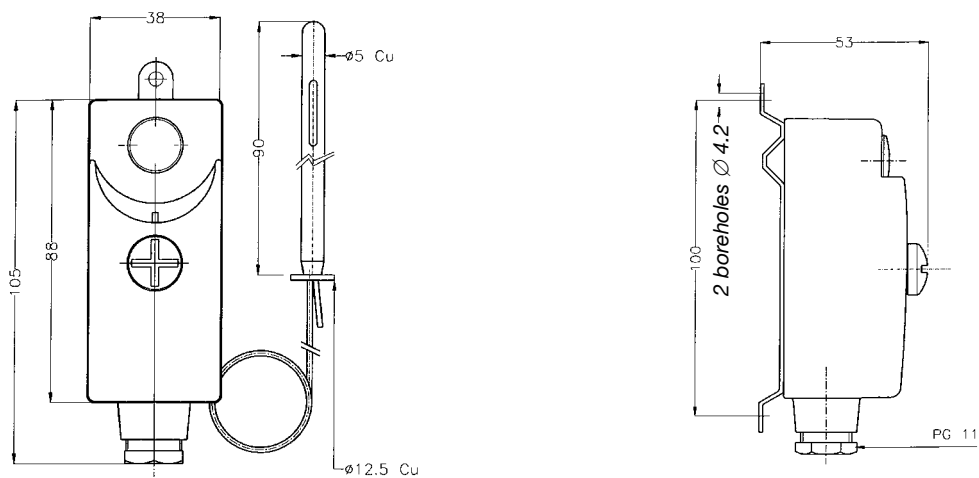
Capillary type thermostats with housing GTK/GSK Room thermostat with housing GRT

Dimensions (in mm))

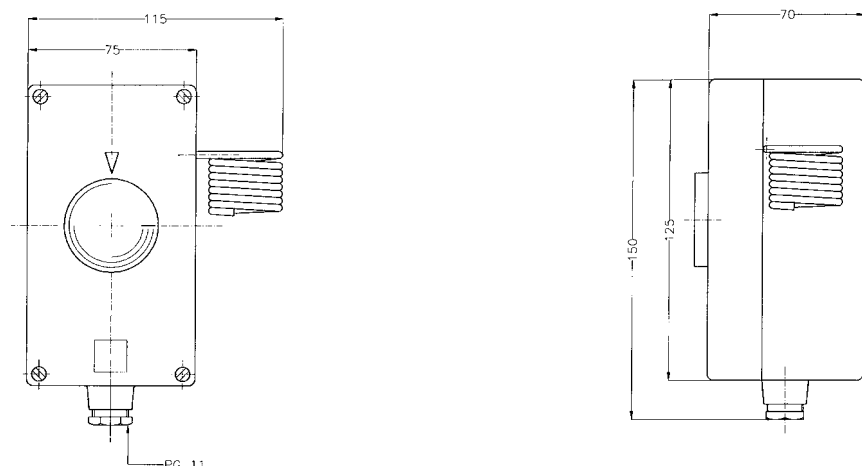
Type GTK/7RD



Type GSK/9SF



Type GRT/7RT



Twin thermostats with housing GDT



Type GDT/8RR

Twin thermostat with housing, with immersion stem and pocket, with 2 control thermostats, adjustable from outside.

Operating ranges
0/60 °C - 30/120 °C
0/90 °C - 30/120 °C

Tolerance
±3 K

Switching differential
5 K ±1 K

Probe element
Liquid-filled

Pocket
Cu alloy, connection 1/2-14 NPT

Stem length
100 mm

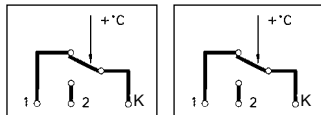
Housing
Base plate galvanised sheet steel
Upper part and adjustment knobs ABS (UL 94 V0)

Housing protection
IP 40

Electrical connections
Cable gland PG 11

Contact rating
K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



Approvals



CE 0497 (PED)



Type GDT/8HR

Twin thermostat with housing, with immersion stem and pocket, with 2 control thermostats, 1 x adjustable from inside, 1 x adjustable from outside.

Operating ranges
0/60 °C - 30/120 °C
0/90 °C - 30/120 °C

Tolerance
±3 K

Switching differential
5 K ±1 K

Probe element
Liquid-filled

Pocket
Cu alloy, connection 1/2-14 NPT

Stem length
100 mm

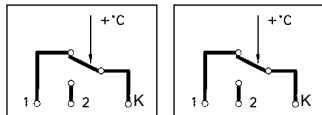
Housing
Base plate galvanised sheet steel
Upper part and adjustment knob ABS (UL 94 V0)

Housing protection
IP 40

Electrical connections
Cable gland PG 11

Contact rating
K1 16 (4) A 250V AC
K1-2 06 (1) A 400V AC

Switching schematic



Approvals



CE 0497 (PED)



Type GDT/8RS

Twin thermostat with housing, with immersion stem and pocket, consisting of temperature control thermostat (TRT), adjustable from outside, and safety temperature switch (STB) with manual reset.

Operating ranges (switch point STB)
0/60 °C (100 °C)
0/90 °C (100 °C)

Switch point accuracy
TRT ±3 K/STB +0/-6 K

Switching differential
TRT 5 K ±1 K/STB 15 - 25 K

Probe element
Liquid-filled

Pocket
Cu alloy, connection 1/2-14 NPT

Stem lengths
100, 150, 200 mm

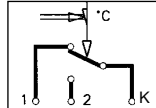
Housing
Base plate galvanised sheet steel
Upper part and adjustment knob ABS (UL 94 V0)

Housing protection
IP 40

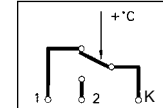
Electrical connections
Cable gland PG 11

Contact rating
K1 16 (4) A 250V AC
K1-2 6 (1) A 400V AC

Switching schematic STB



Switching schematic TRT



Approvals



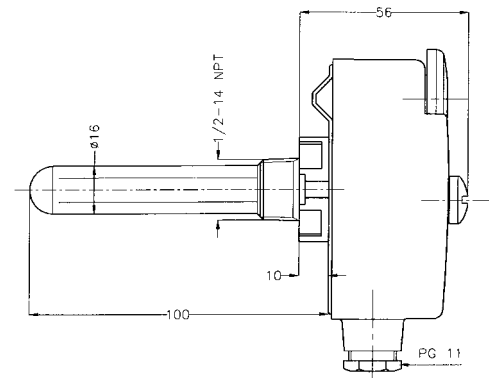
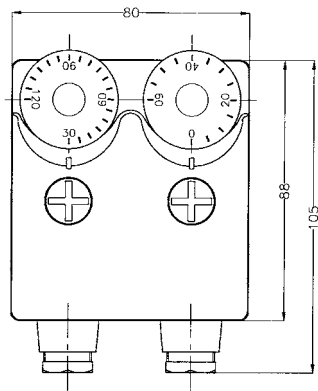
CE 0497 (PED)



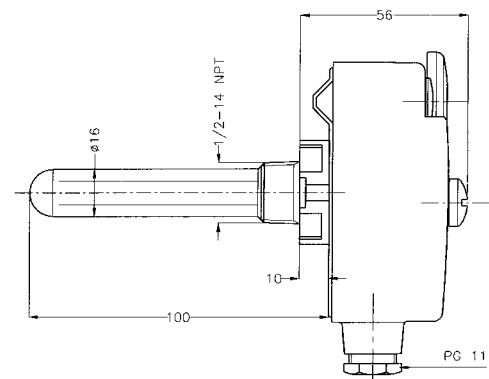
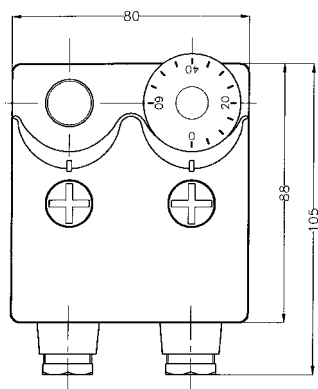
Twin thermostats with housing GDT

Dimensions (in mm)

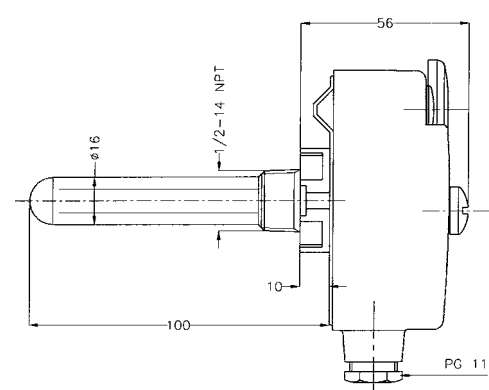
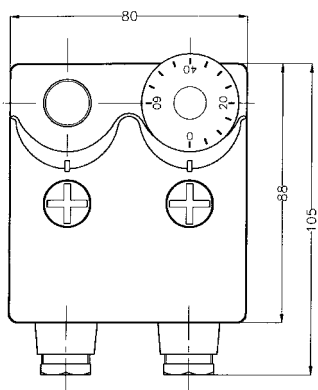
Type GDT/8RR



Type GDT/8HR



Type GDT/8RS



Room thermostats

DG: G

Type	Adjustment	Operating range/ switch point	Capillary length	Stem length	Packing unit*	Part no.	Price €
Surface mounting thermostats with housing							
GAT/7RC	outside	0/60 °C	---	---	28	67400	
GAT/7RC	outside	0/90 °C	---	---	28	67401	
GAT/7HC	inside	0/60 °C	---	---	28	67402	
GAT/7HC	inside	0/90 °C	---	---	28	67403	
GSA/9SC	inside	30/70 °C	---	---	28	67404	
Immersion thermostats with housing							
GTT/7RG	outside	0/60 °C	---	100 mm	20	67405	
GTT/7RG	outside	0/90 °C	---	100 mm	20	67407	
GTT/7RG	outside	0/90 °C	---	150 mm	10	67408A	
GTT/7RG	outside	0/90 °C	---	200 mm	10	67408B	
GTT/7HG	inside	0/60 °C	---	100 mm	20	67411	
GTT/7HG	inside	0/90 °C	---	100 mm	20	67413	
GTT/7HG	inside	0/90 °C	---	150 mm	10	67414A	
GTT/7HG	inside	0/90 °C	---	200 mm	10	67414B	
GST/9SG	fixed	100 °C	---	100 mm	20	67417	
Capillary type thermostats with housing/Room thermostats with housing							
GTK/7RD	outside	0/60 °C	1,000 mm	---	20	67419	
GTK/7RD	outside	0/90 °C	1,000 mm	---	20	67421	
GTK/7RD	outside	-35/+35 °C	1,500 mm	---	20	67423	
GSK/9SF	inside	70/110 °C	1,500 mm	---	20	67418	
GRT/7RT	outside	0/40 °C	---	---	12	67464	
GRT/7RT	outside	0/60 °C	---	---	12	67465	
GRT/7HT	inside	0/40 °C	---	---	12	67466	
GRT/7HT	inside	0/60 °C	---	---	12	67467	
GRT/7WD	outside	0/40 °C	1,000 mm	---	12	67468	
GRT/7WD	outside	0/60 °C	1,000 mm	---	12	67469	
GRT/7KD	inside	0/40 °C	1,000 mm	---	12	67435	
GRT/7KD	inside	0/60 °C	1,000 mm	---	12	67437	
Twin thermostats with housing							
GDT/8RR	outside/outside	0/60 °C - 30/120 °C	---	100 mm	5	67439	
GDT/8RR	outside/outside	0/90 °C - 30/120 °C	---	100 mm	10	67441	
GDT/8HR	inside/outside	0/60 °C - 30/120 °C	---	100 mm	5	67445	
GDT/8HR	inside/outside	0/90 °C - 30/120 °C	---	100 mm	10	67447	
GDT/8RS	fixed/outside	0/60 °C (100 °C)	---	100 mm	10	67451	
GDT/8RS	fixed/outside	0/90 °C (100 °C)	---	100 mm	5	67453	
GDT/8RS	fixed/outside	0/90 °C (100 °C)	---	150 mm	9	67454A	
GDT/8RS	fixed/outside	0/90 °C (100 °C)	---	200 mm	9	67454B	

* Minimum order quantity for non-stock items = 100 pieces

Resistance thermometers types WTh 20/21/22



Type WTh 20

Version

Plug-in type resistance thermometer

Design

Rigid probe

Sensor

1 x Pt 100

2-, 3- or 4-wire

Class B, IEC 751

Probe

Ø 6 mm, length 50 mm

Stainless steel 1.4571

Electrical connection

Either cable with free ends (standard), plug DIN 43650-A, or miniature round plug, or Lemos plug

Cable

Either PVC (standard) or silicon or PTFE or fibreglass

Measuring range

-35/+100 °C

Options

- Coated measuring cable
- Sensor class A
- Process connection as adjustable male compression fitting or fixed male connection
- Other probe diameters
- Other probe lengths
- Thermally decoupled
- Bending protection



Type WTh 21

Version

Room and outside resistance thermometer for wall mounting

Design

Closed probe

Sensor

1 x Pt 100

2-, 3- or 4-wire

Class B, IEC 751

Probe

Ø 6 mm, length 44 mm

Stainless steel 1.4571

Electrical connection

Cable gland

Measuring range

-30/+60 °C

Housing

Impact resistant plastic

W x H x D: 58 x 64 x 34 mm

Protection

IP 54 (EN 60529)

Options

- Open probe
- Sensor class A
- Sensor Pt 1000/Ni 1000
- Transmitter installation



Type WTh 22

Version

Resistance thermometer especially for use in air ducts

Sensor

1 x Pt 100

3-wire

Class B, IEC 751

Thermowell

Ø 8 x 1 mm, perforated

Stainless steel 1.4571

Process connection

Fastening flange Ø 41 mm, adjustable, stainless steel

Installation lengths

100, 160, 250 mm

Housing

Impact resistant plastic

W x H x D: 58 x 64 x 34 mm

Protection

IP 54 (EN 60529)

Measuring range

0/130 °C

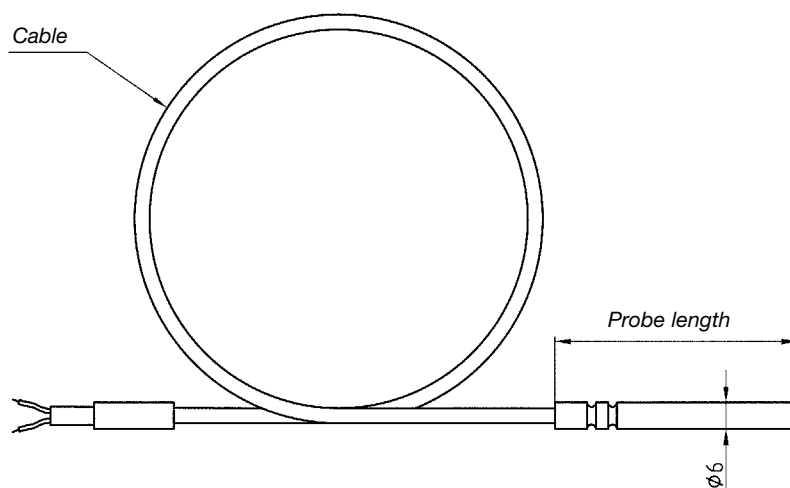
Options

- Process connection G1/2B (adjustable male compression fitting or fixed male connection)
- Transmitter installation (standard: 0/100 °C = 4-20 mA)

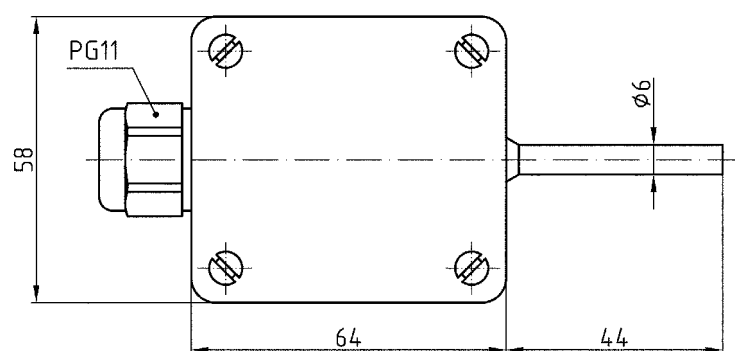
Resistance thermometers types WTh 20/21/22

Dimensions (in mm)

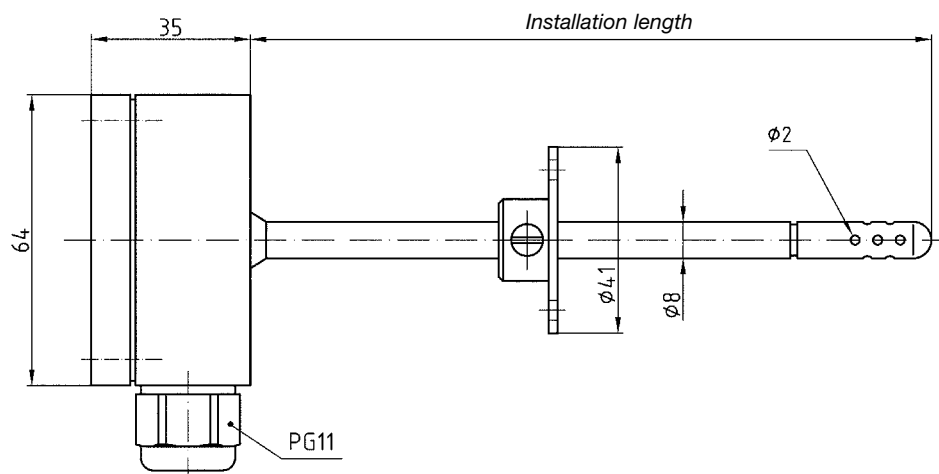
Type WTh 20



Type WTh 21



Type WTh 22



Resistance thermometers types WTh 23/24/25



Type WTh 23

Version

Variable screw-in resistance thermometer, compact design

Sensor

1 x Pt 100
 2-, 3- or 4-wire
 Class B, IEC 751

Measurement insert

Not replaceable

Thermowell

Ø 6 mm, stainless steel 1.4571

Process connection

G¹/₄B stainless steel 1.4571

Installation length

100 mm

Connection head (protection)

Design J, aluminium die cast (IP 54)

Measuring range

-35/+350 °C

Options

- Sensor class A
- Other thermowell diameters
- Thermowell with shoulder, measuring tip with spring
- Neck
- Other process connections
- Other installation lengths
- Transmitter installation



Type WTh 24

Version

Screw-in resistance thermometer for medium pressure and flow loads, specially for HVAC

Sensor

1 x Pt 100
 3-wire
 Class B, IEC 751

Measurement insert

Replaceable

Thermowell

According to DIN 43772
 Ø 9 x 1 mm, stainless steel 1.4571

Neck

Ø 9 x 1 mm, 25 mm long
 Stainless steel 1.4571

Process connection

G¹/₂B stainless steel 1.4571

Installation lengths

100, 160, 250 mm

Connection head (protection)

Design B according to DIN 43729
 Aluminium die cast (IP 54)

Measuring range

-30/+180 °C

Options

- Transmitter installation (standard: 0/100 °C = 4-20 mA)



Type WTh 25

Version

Screw-in resistance thermometer for medium pressure and flow loads

Sensor

1 x Pt 100
 2-, 3- or 4-wire
 Class B, IEC 751

Measurement insert

Replaceable, Ø 6 mm

Thermowell

According to DIN 43772
 Ø 9 x 1 mm, stainless steel 1.4571

Neck

Ø 9 x 1 mm, 120 mm long
 Stainless steel 1.4571

Process connection

G¹/₂B stainless steel 1.4571

Installation lengths

100, 125, 160, 250, 400 mm

Connection head (protection)

Design B according to DIN 43729
 Aluminium die cast (IP 54)

Measuring range

-35/+400 °C

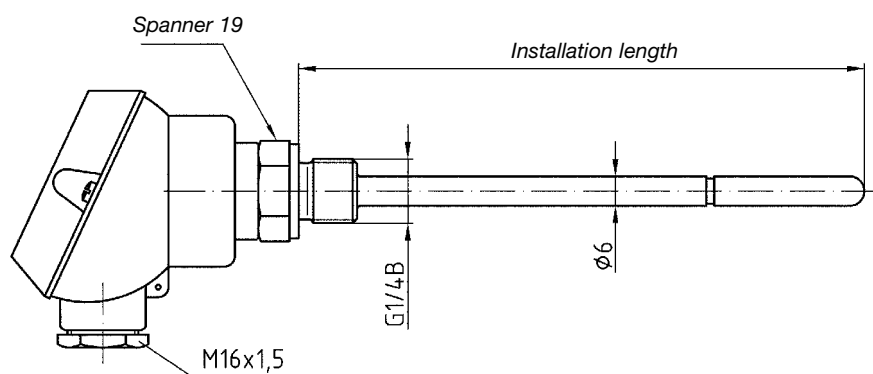
Options

- Sensor class A
- Reduced measuring tip (6 mm)
- Transmitter installation
- Ex version
- Other thermowell materials, process connections, installation lengths

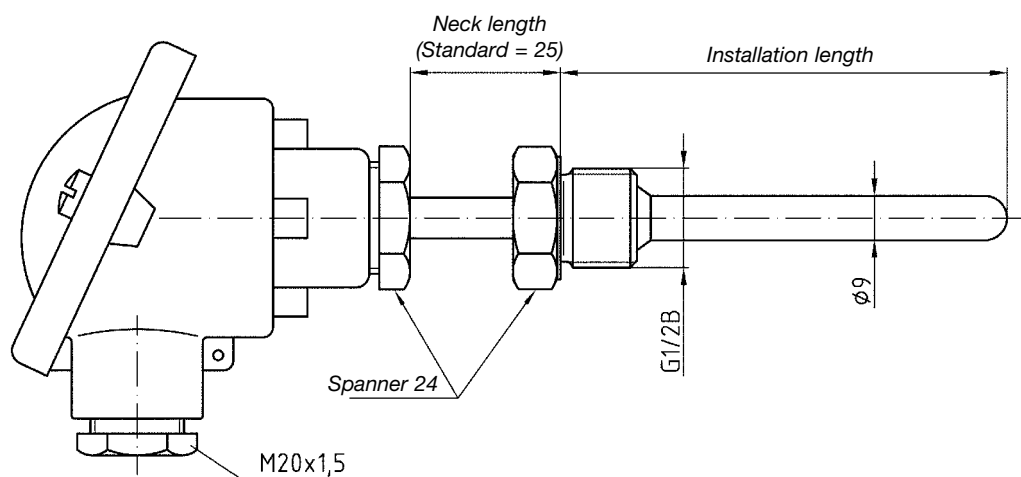
Resistance thermometers types WTh 23/24/25

Dimensions (in mm)

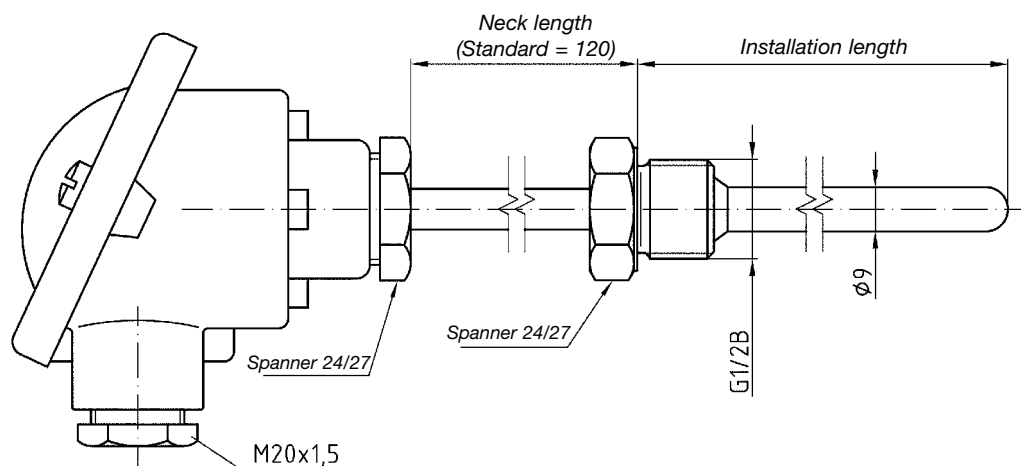
Type WTh 23



Type WTh 24



Type WTh 25



Resistance thermometers types WTh 26/27/28



Type WTh 26

Version

Weld-in resistance thermometer for high pressure and flow loads

Sensor

1 x Pt 100
 2-, 3- or 4-wire
 Class B, IEC 751

Measurement insert

Replaceable, Ø 6 mm

Thermowell

According to DIN 43772
 Stainless steel 1.4571

Neck

Ø 11 x 2 mm, 140 mm long
 Stainless steel 1.4571

Installation lengths

65, 100, 160, 250 mm

Connection head (protection)

Design B according to DIN 43729
 Aluminium die cast (IP 54)

Measuring range

-35/+550 °C

Options

- Sensor class A
- Without thermowell (thread M18x1.5 and M14x1.5)
- Transmitter installation
- Ex version
- Other thermowell materials, process connections, installation lengths, connection heads



Type WTh 27

Version

Flanged resistance thermometer for medium pressure and flow loads

Sensor

1 x Pt 100
 2-, 3- or 4-wire
 Class B, IEC 751

Measurement insert

Replaceable, Ø 6 mm

Flanged thermowell

Several parts, Ø 11 x 2 mm
 Flange connection according to EN 1092-1
 Design B 1, DN25, PN40
 Stainless steel 1.4571

Neck

Ø 11 x 2 mm, 120 mm long
 Stainless steel 1.4571

Installation lengths

100, 160, 250, 400 mm

Connection head (protection)

Design B according to DIN 43729
 Aluminium die cast (IP 54)

Measuring range

-35/+400 °C

Options

- Sensor class A
- Reduced measuring tip (6 mm)
- Transmitter installation
- Ex version
- Other thermowell materials, process connections, installation lengths, connection heads



Type WTh 28

Version

Resistance thermometer for hygienic processes, e.g. food, beverage, pharmaceutical, bio-technological applications

Sensor

1 x Pt 100
 2-, 3- or 4-wire
 Class B, IEC 751

Measurement insert

Replaceable, Ø 6 mm

Thermowell

Ø 9 x 1 mm, stainless steel 1.4571

Neck

Ø 9 x 1 mm, 145 mm long
 Stainless steel 1.4571

Process connection

Either clamp, screw connection
 DIN 11851, weld-in ball, weld-in socket

Installation length

100, 125, 160, 250, 400 mm

Connection head (protection)

Design B, type BUZ
 Aluminium die cast (IP 54)

Measuring range

-35/+200 °C

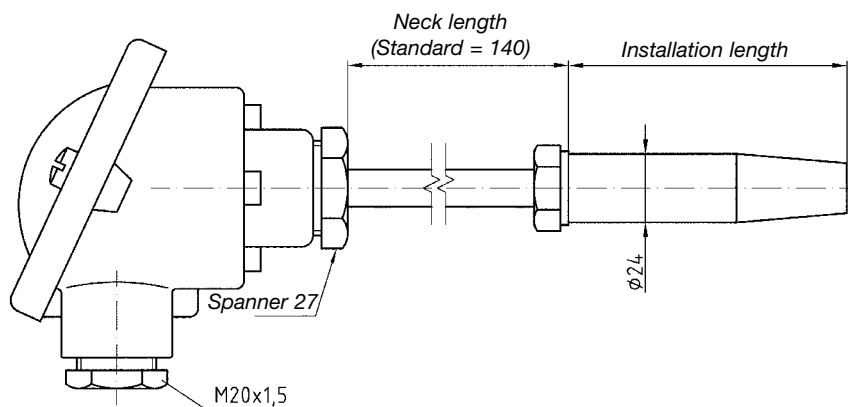
Options

- Sensor class A
- Reduced measuring tip (6 mm)
- Other thermowell materials
- Other process connections
- Other installation lengths
- Transmitter installation
- Ex version
- Weatherproof housing

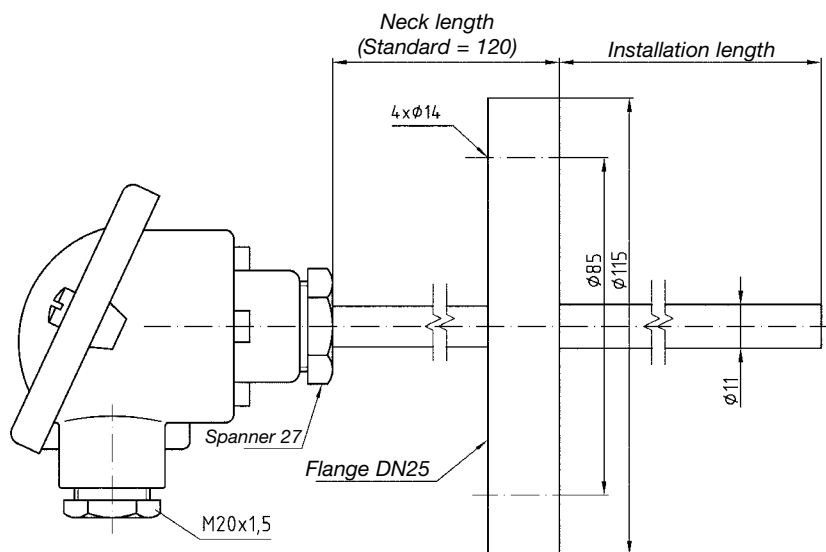
Resistance thermometers types WTh 26/27/28

Dimensions (in mm)

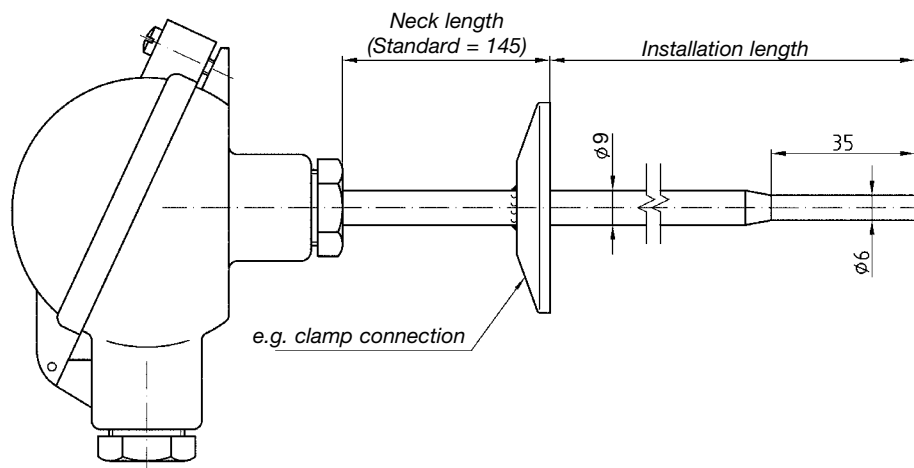
Type WTh 26



Type WTh 27

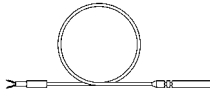
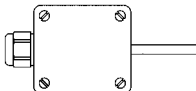
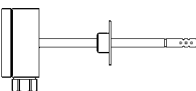
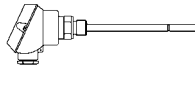
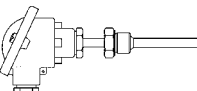


Type WTh 28



Resistance thermometers

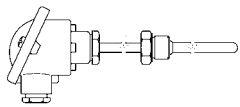
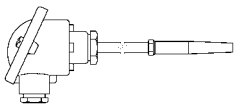
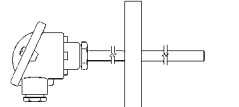
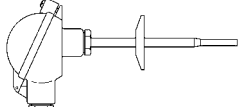
DG: E

Type	WTh 20	WTh 21	WTh 22	WTh 23	WTh 24
Version					
Sensor	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B
Thermowell/probe Diameter Material	Rigid 6 mm Stainless steel 1.4571	Closed 6 mm Stainless steel 1.4571	Perforated 8 mm Stainless steel 1.4571	6 mm Stainless steel 1.4571	9 mm Stainless steel 1.4571
Neck	---	---	---	---	25 mm
Process connection	---	---	Fastening flange Ø 41 mm	G ¹ / ₄ B Edelstahl 1.4571	G ¹ / ₂ B Stainless steel 1.4571
Connection head/ electrical connection	PVC cable free ends	Plastic/cable gland	Plastic/cable gland	Design J/ cable gland	DIN 43729, Design B cable gland
Measuring range	-35/+100 °C	-30/+60 °C	0/+130 °C	-35/+350 °C	-30/+180 °C
Installation length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
44 mm	Probe length 50 mm up to cable length 2,000 mm 32220 Cable extension per 500 mm	32400	---	---	---
100 mm		---	32215	32225	32210
160 mm		---	32216	32226	32211
250 mm		---	32217	32227	32212
400 mm		---	---	32228	---
Additional costs					
Per additional 100 mm installation length	---	---			
1 x Pt 100 4-wire					
2 x Pt 100 2-wire	---	---	---		---
Sensor Class A					
Connection head design BBK	---	---			---
Transmitter installation* DC12-36V/4-20mA	---	on request			
Transmitter installation* DC18-40V/0-10V	---	on request		---	

* Applies to standard ranges (-50/+50, 0/50, 0/100, 0/120, 0/150, 0/200, 0/300 °C), additional cost in all other cases.

Resistance thermometers

DG: E

Type	WTh 25	WTh 26	WTh 27	WTh 28
Version				
Sensor	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B
Thermowell/probe	Design B	Weld-in thermowell	Flange DN 25/PN 40	
Diameter	9 mm	according to DIN 43772*	11 mm	9 mm
Material	stainless steel 1.4571	stainless steel 1.4571	stainless steel 1.4571	stainless steel 1.4571
Neck	120 mm	140 mm	120 mm	145 mm
Process connection	G ¹ / ₂ B stainless steel 1.4571	Weld-in thermowell according to DIN 43772*	Flange DN 25/PN 40	Clamp 1"
Connection head/ electrical connection	DIN 43729, design B cable gland	DIN 43729, design B cable gland	DIN 43729, design B cable gland	Design B, Typ BUZ cable gland
Measuring range	-35/+400 °C	-35/+550 °C	-35/+400 °C	-35/+200 °C
Installation length	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
65 mm	---	32250	---	---
100 mm	32240	32251	32260	32230
125 mm	32241	---	---	32231
160 mm	32242	32253	32261	32232
250 mm	32243	32254	32262	32233
400 mm	32244	---	32263	32234
Additional costs				
Per additional 100 mm installation length		---		
Transmitter installation** DC 12-36 V/4-20 mA				
1 x Pt 100 4-wire				
2 x Pt 100 2-wire				
Sensor class A				
Reduced measuring tip (Ø 6 mm)		---		
Clamp 1 1/2"	---	---	---	
DIN 11851, DN 40	---	---	---	
Hygienic, DN 40	---	---	---	
Weld-in ball	on request	---	---	
Weld-in socket	---	---	---	on request
Ex version WTh				
Ex transmitter EEx ib** DC 12-36 V / 4-20 mA				

* Refer to page 226 for thermowells made of other materials. – ** Applies to standard ranges (-50/+50, 0/50, 0/100, 0/120, 0/150, 0/200, 0/300, 0/400, 0/500 °C), additional cost in all other cases

Resistance thermometer WTh 30 for hygienic processes



Application

For temperature measurement in tanks and pipelines and applications requiring hygienic process connections, materials and processing. Specially suitable for food technology, pharmaceutical and biotechnology applications due to the compact design and the high accuracy.

Description

WTh 30 consists of a rugged stainless steel housing with variable process connections and a Pt 100 measurement insert which is directly integrated in a thermowell. The change in resistance depending on the measured temperature can be used directly or detected by a transducer and converted into a 4-20 mA output signal. The instrument is connected by means of a compact M12 plug connection.

WTh 30 features:

- Hygienic design according to EHEDG recommendations
- Compact design
- High accuracy
- Short response time
- Variable process connections
- Integratable transducer

Technical specifications

Measuring range

-50/+200 °C

Response time

According to IEC 751, test in flowing water (without transducer)
 $T_{90} = 5.5 \text{ s}$

Sensor

1 x Pt 100, 4-wire
 Class A, IEC 751

Thermowell

Stainless steel 1.4404, Ø 6 mm

Installation lengths

15, 25, 30, 35, 50, 100, 150, 200 mm

Housing

Stainless steel, Ø 18 mm

Protection

IP 67 (EN 60529)

Electrical connections

M 12 plug connection
 Plug housing stainless steel

Process connections

Stainless steel 1.4435, one of the following:
 $G^{1/2}B$
 $G^{1/2}B$, tapered, metallic seal
 M12x1.5, tapered, metallic seal
 Grooved union nut DIN 11851
 Clamp DIN 32676
 Clamp ISO 2852
 Tri-Clamp
 Varivent quick-action connection

Surface roughness

$R_a < 0.8 \mu\text{m}$

Welding seam $< 1.6 \mu\text{m}$

Operating pressure

Max. 16 bar

(Varivent D68 max. 10 bar)

Technical specifications transducer (option)

Version

Transducer directly integrated in the plug housing, with encapsulated electronics

Measuring range

-50/+150 °C

(configuration according to specifications)

Minimum span 10 K

Supply voltage

DC 10-35 V

Output signal

4-20 mA, 2-wire

Options

- Integrated transducer
- Other process connections
- Electropolishing
- Reduced measuring tip (Ø 4 mm)
- Replaceable measurement insert
- Other installation lengths
- Weld-in connectors

Resistance thermometer WTh 30

Dimensions (in mm) and electrical connections

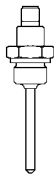
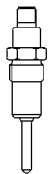
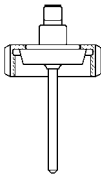
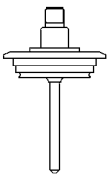


Connection G1/2B Connection M 12x1.5, metallic seal	Connection G1/2B, metallic seal Weld-in connector with control borehole without control borehole
Tapered socket with grooved union nut DIN 11851 Rd.52x1/6 (DN25) Rd.58x1/6 (DN32) DN 25 G = Rd 52x1/6 DN 32 G = Rd 58x1/6	Clamp connection Tri-Clamp 1"/1 1/2" ISO 2852 DN25/38 32676 DN 25/40 Varivent connection D=31 for varivent housing DN 10 and 15 D=50 for varivent housing DN 25 and 1" DIN D=68 for varivent housing DN 40-125
Version with transducer Thermowell versions	Pin assignment without transducer 1 x Pt 100 Pin assignment with transducer 4-20 mA, 2-wire

Resistance thermometer WTh 30

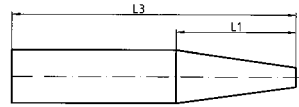
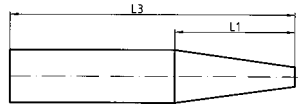


DG: E

Type	WTh 30	WTh 30 DK	WTh 30 MR	WTh 30 CP	WTh 30 VT
Version					
Sensor	1 x Pt 100 4-wire, class A	1 x Pt 100 4-wire, class A	1 x Pt 100 4-wire, class A	1 x Pt 100 4-wire, class A	1 x Pt 100 4-wire, class A
Thermowell/probe Diameter	6 mm	6 mm	6 mm	6 mm	6 mm
Material	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4404
Process connection	G ¹ / ₂ B	G ¹ / ₂ B tapered, metallic seal	Grooved union nut DIN 11851 DN 25	Clamp ISO 2852 DN 25	Varivent D = 31
Electrical connection	M12 plug connection	M12 plug connection	M12 plug connection	M12 plug connection	M12 plug connection
Measuring range	-50/+200 °C	-50/+200 °C	-50/+200 °C	-50/+200 °C	-50/+200 °C
Installation length L1	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
15 mm	32300	32308	32316	32324	32332
25 mm	32301	32309	32317	32325	32333
30 mm	32302	32310	32318	32326	32334
35 mm	32303	32311	32319	32327	32335
50 mm	32304	32312	32320	32328	32336
100 mm	32305	32313	32321	32329	32337
150 mm	32306	32314	32322	32330	32338
200 mm	32307	32315	32323	32331	32339
Additional costs	Price €	Price €	Price €	Price €	Price
Integrated transducer 4-20 mA*					
Reduced measuring tip Ø 4 mm					
Process connection					
M12x1.5, tapered	---	no additional cost	---	---	---
DIN 11851 DN 32	---	---	---	---	---
ISO clamp DN 38	---	---	---	no additional cost	---
DIN clamp DN 25	---	---	---	no additional cost	---
DIN clamp DN 40	---	---	---	no additional cost	---
Tri-Clamp 1"	---	---	---	no additional cost	---
Tri-Clamp 1 1/2"	---	---	---	no additional cost	---
Varivent D=50	---	---	---	---	---
Varivent D=68	---	---	---	---	---
Accessories			Part no.	Price €	
Weld-in connector for G ¹ / ₂ B tapered, metallic seal, without control hole			32340		
Weld-in connector for G ¹ / ₂ B tapered, metallic seal, with control hole			32341		

* Please specify desired measuring range: 0/+100 °C, 0/+150 °C, -50/+100 °C (corresponding to 4-20 mA each)

Thermowells for resistance thermometers

Weld-in thermowells, single-piece according to DIN - design 4 Max. operating pressure as per DIN 43772							
Design	Thermometer connection	Hole	Length L3	Cone length L1	Thermowell material	Part no.	Price*
D1	M 18 x 1.5	7 mm	140 mm	65 mm	1.0460 (C 22.8)	64590	
					1.4571 (CrNiMoTi)	64591	
					1.7335 (13CrMo44)	64592	
					1.5415 (15Mo3)	64593	
					1.7380 (10CrMo910)	64594	
D2	M 18 x 1.5	7 mm	200 mm	125 mm	1.0460 (C 22.8)	64595	
					1.4571 (CrNiMoTi)	64596	
					1.7335 (13CrMo44)	64597	
					1.5415 (15Mo3)	64598	
					1.7380 (10CrMo910)	64599	
D4	M 18 x 1.5	7 mm	200 mm	65 mm	1.0460 (C 22.8)	64600	
					1.4571 (CrNiMoTi)	64601	
					1.7335 (13CrMo44)	64602	
					1.5415 (15Mo3)	64603	
					1.7380 (10CrMo910)	64604	
D5	M 18 x 1.5	7 mm	260 mm	125 mm	1.0460 (C 22.8)	64605	
					1.4571 (CrNiMoTi)	64606	
					1.7335 (13CrMo44)	64607	
					1.5415 (15Mo3)	64608	
					1.7380 (10CrMo910)	64609	
Weld-in thermowells, single-piece, similar to DIN - design 4 Max. operating pressure as per DIN 43772							
Design	Thermometer connection	Hole	Length L3	Cone length L1	Thermowell material	Part no.	Price*
D 0 S	M 18 x 1.5	7 mm	110 mm	65 mm	1.4571 (CrNiMoTi)	64610	
					1.7335 (13CrMo44)	64611	
					1.5415 (15Mo3)	64612	
					1.7380 (10CrMo910)	64613	
D 1 S	M 18 x 1.5	7 mm	140 mm	65 mm	1.4571 (CrNiMoTi)	64614	
					1.7335 (13CrMo44)	64615	
					1.5415 (15Mo3)	64616	
					1.7380 (10CrMo910)	64617	
D 4 S	M 18 x 1.5	7 mm	200 mm	65 mm	1.4571 (CrNiMoTi)	64618	
					1.7335 (13CrMo44)	64619	
					1.5415 (15Mo3)	64620	
					1.7380 (10CrMo910)	64621	
D 5 S	M 18 x 1.5	7 mm	200 mm	125 mm	1.4571 (CrNiMoTi)	64622	
					1.7335 (13CrMo44)	64623	
					1.5415 (15Mo3)	64624	
					1.7380 (10CrMo910)	64625	

* The prices of the above thermowells vary greatly depending on the quantities ordered.
Please enquire for project-specific prices.

Pipeline temperature sensor RTS

RTS with plug DIN 43650-A



RTS with round connector



RTS with plug-in display DA 06



Application

Suitable for measuring temperature in pipelines in which a probe cannot reach into the medium. Specially suitable for hygienic applications in the food and pharmaceutical industries as well as for biotechnology and painting systems.

Description

The RTS pipeline temperature sensor consists of a pipe piece with variable process connections and a sensor part contained in the centre. The sensor part contains a flush Pt 100 sensor.

A number of thermal coupling and decoupling measures at the Pt 100 sensor minimise thermal errors. This allows for optimum detection of the temperature of the medium. The pipeline temperature sensor can be easily installed at any point of the pipeline.

There is no probe reaching into the medium. This offers the following advantages:

- The pipeline can be cleaned with a scraper.
- There are no swirls in the pipeline.
- No danger of sensor damages in highly viscous media.
- Special internal coatings are available for corrosive media.
- Superior surface quality is possible by means of electro-polishing.

Technical specifications Pipeline temperature sensor

Measuring range
0/150 °C

Sensor
1 x Pt 100
2-, 3- or 4-wire
Class B, IEC 751

Basic values
According to EN 60751

Measuring current
Approx. 1 mA
(film measuring resistor)

Process connection (both ends)
One of the following:
Clamp DIN 32676
Screwed pipe connection
DIN 11851/SMS with union nut
Male thread DIN 11887/SMS
Flange according to DIN 2633
Flange according to ANSI B 16.5

Nominal widths
DN 25 to DN 100
or 1" to 4"

Pipe material
Stainless steel 1.4301

Insulation resistance
≥ 100 MOhm at 20 °C (DC 500 V)

Electrical connection
Plug DIN 43650-A

Protection
IP 65 (EN 60529)

Technical specifications Transmitter (option)

Version
Ceramic hybrid transmitter, mounted directly in the neck

Ambient temperature
Max. 100 °C

Supply voltage
DC 12-28 V

Output signal
4-20 mA, 2-wire

Options

- Transmitter installation
- Other pipe materials
- Inner pipe electropolished
- Other process connections
- Other pipe dimensions
- Other measuring ranges
- Fixed cable connection
- Other plug-in connectors
- Sensor class A
- Digital plug-in display DA 06 (for version with transmitter)

Price on request.

Digital electronic thermometer TD 10

Digital electronic temperature controller TSD 20

TD 10/2



TSD 20/3



Temperature probe (Pt 100)



TD 10

Digital electronic thermometer with microprocessor control

Range/sensor type

-50/+150 °C PTC
-50/+300 °C Pt 100, 3-wire

Resolution

1 °C (0.1 °C from -19.9/+99.9 °C)

Temperature probe

PTC or Pt 100, 3-wire
Cable length 1.5 m

Supply voltage

AC/DC 12 V $\pm 10\%$

Power consumption

max. 3 VA

Housing

ABS, black
Bezel:
W x H x D: 74 x 32 x 70 mm
Panel cut out:
W x H: 71 x 29 mm
Mounting by means of screws

TSD 20

Digital electronic temperature controller with microprocessor control

Range/sensor type

-50/+150 °C PTC
-50/+300 °C Pt 100, 3-wire

Resolution

1 °C (0.1 °C from -19.9/+99.9 °C)

Temperature probe

PTC or Pt 100, 3-wire
Cable length 1.5 m

Supply voltage

AC/DC 12 V $\pm 10\%$

Power consumption

max. 3 VA

Output

Relay contact: 1 x changeover
contact
Contact rating: 250 V, 2 A

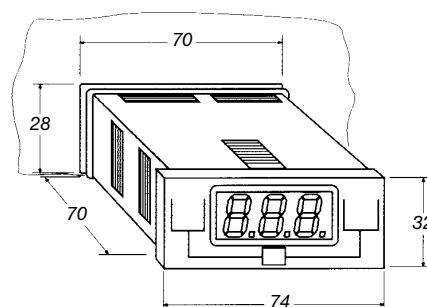
Switching differential - adjustable

0.0 K to 25.5 K

Housing

ABS, black
Bezel:
W x H x D: 74 x 32 x 70 mm
Panel cut out:
W x H: 71 x 29 mm
Mounting by means of screws

Dimensions (in mm) TD 10/TSD 20



Prices TD 10/TSD 20

(prices include temperature probe)

DG: H

Version	Part no.	Price €
TD 10/2 -50/+150 °C	31261	
TD 10/3 -50/+300 °C	31262	
TSD 20/2 -50/+150 °C	31264	
TSD 20/3 -50/+300 °C	31265	
Transformer AC 230/12 V	31266	
Spare temp. probe -50/+150 °C (PTC)	31267	
Spare temp. probe -50/+300 °C (Pt 100, 3-wire)	31269	

Chapter 11

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Pressure gauges and controllers

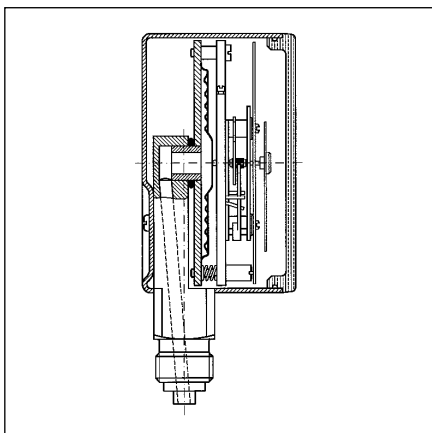
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Standard capsule type pressure gauges EN 837-3



Application

For gaseous, dry media which do not attack copper alloys.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Types

D 2/D 3

Nominal size

63 - 80 - 100

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

0/25 to 0/1,000 mbar and all corresponding vacuum and compound ranges with overpressure protection

Application area

Static load:

full scale value

Dynamic load:

0.9 x full scale value

Overload safety:

1.3 x full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:
 rising temp. approx. $\pm 0.6\%$ /10K
 falling temp. approx. $\pm 0.6\%$ /10K
 percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Brass, bottom or centre back

NG 63 G $\frac{1}{4}$ B - spanner size 14

NG 80 - 100 G $\frac{1}{2}$ B - spanner size 22

(EN 837-3/7.3)

Measuring element

Capsule element, CuBe alloy

Movement

Brass

Zero correction

From the front

Seal

„Perbunan“ nitrile rubber

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

D 2 – black sheet steel

D 3 – stainless steel 1.4301

Front glass

Clip-in plastic

Options

- Nominal size 50
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Movement stainless steel (NG 100)
- Damping screw
- Reference pointer
- Special scales

Standard capsule type pressure gauges

Type D 2/D 3 - NG 63/80/100

Housing types and dimensions

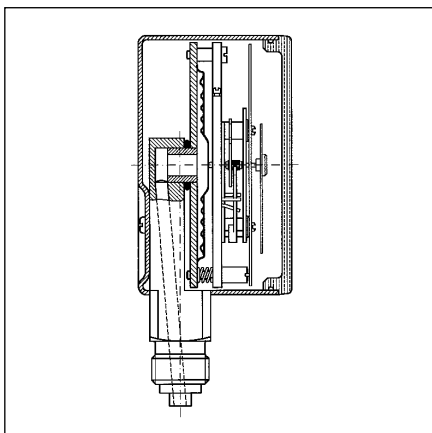
<i>Bottom connection</i>	<i>Bottom connection, back flange</i>
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<i>Centre back connection, crimped bezel housing with clamp fixing, NG 63, (version D351)</i>	<i>Centre back connection, panel mounting bezel for clamp fixing, NG 80/100</i>

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	b4	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	d7	G	g	g1	g2
63	9.5	12	33.7	36.2	35.7	30.5	-	5	2	13	75	85	3.5	68	68	64	66	G ¹ / ₄ B	56.7	58.7	53.5
80	14.8	17.8	43.3	46.3	44.6	-	46.5	6	3	20	95	110	4.8	-	86	81	83	G ¹ / ₂ B	75.3	76.6	-
100	15.6	19.1	44	47.5	45.6	-	47	6	3	20	116	132	4.8	-	107	101	105	G ¹ / ₂ B	76	77.6	-
Nominal size (NG)	g3	h	m	n	s	s1	s2	s3	s4	s5	SW										
63	-	52.7	94	82	3.7	5.5	3	2	7	4	14										
80	78	69	-	-	3.8	5.5	3.5	2	-	4.5	22										
100	79	87	-	-	3.5	5.5	3.5	2	-	4.5	22										

* Dimensions for NG 100 according to DIN EN 837-3

Standard capsule type pressure gauges EN 837-3



Application

For gaseous, dry media which do not attack copper alloys.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

63 - 100 - 160

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

NG 63-100 0/25 to 0/1,000 mbar

NG 160 0/6 to 0/1,000 mbar

and all corresponding vacuum and compound ranges with over-pressure protection

Application area

Static load:

full scale value

Dynamic load:

0.9 x full scale value

Overload safety:

1.3 x full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Additional error when the temperature of the measuring element deviates from $+20\text{ °C}$:
 rising temp. approx. $\pm 0.6\text{ ‰} / 10\text{K}$
 falling temp. approx. $\pm 0.6\text{ ‰} / 10\text{K}$
 percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Brass, bottom or centre back

NG 63 G $\frac{1}{4}$ B - spanner size 14

NG 100 - 160 G $\frac{1}{2}$ B - spanner size 22
 (EN 837-3/7.3)

Measuring element

Capsule element, CuBe alloy

Movement

Brass

Zero correction

From the front

Seal

„Perbunan“ nitrile rubber

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Instrument glass

Options

- Overpressure safety 10 x FSD
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing panel mounting bezel
- Damping screw
- Reference pointer
- Special scales

Standard capsule type pressure gauges

Type D 4 - NG 63/100/160

Housing types and dimensions

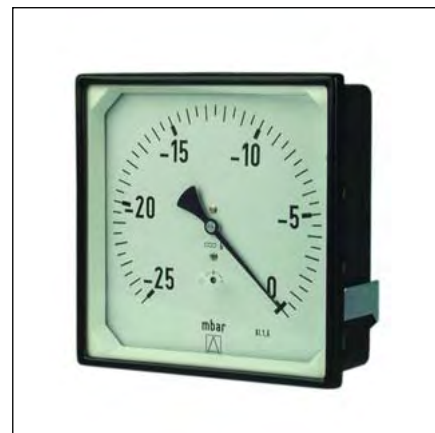
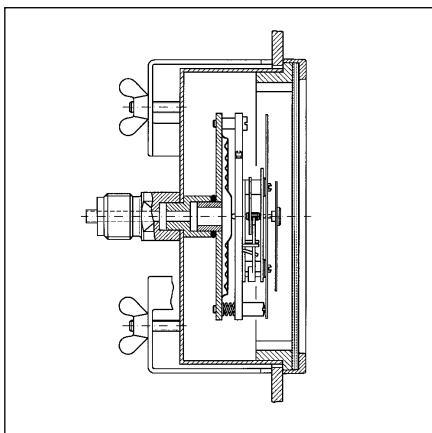
<i>Bottom connection</i>	<i>Bottom connection, back flange</i>
<i>Centre back connection</i>	<i>Centre back connection, 3-hole fixing, panel mounting bezel</i>
<i>Centre back connection, panel mounting bezel for clamp fixing</i>	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	G	g	g1	h	s1	s2
63	10.8	13.4	40	42.1	37	37	5	2	13	75	85	3.5	64	68	64	G ¹ / ₄ B	60	60	53	5.2	3
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	G ¹ / ₂ B	81	81	86	5.5	4
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	G ¹ / ₂ B	82	84	116	6	4
Nominal size (NG)	s3	s4	SW																		
63	2	3	14																		
100	2	4	22																		
160	2	4.5	22																		

* Dimensions for NG 100 according to DIN EN 837-3

Capsule type pressure gauge with square bezel for panel mounting



Application

For gaseous, dry media which do not attack copper alloys.

For panel mounting.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Types

D 1 / D 2 / D 3

Nominal size

72 x 72, 96 x 96, 144 x 144

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

0/25 to 0/1,000 mbar and all corresponding vacuum and compound ranges with overpressure protection

Application area

Static load:

full scale value

Dynamic load:

0.9 x full scale value

Overload safety:

1.3 x full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.6\text{ % /10K}$

falling temp. approx. $\pm 0.6\text{ % /10K}$

percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Brass, centre back

NG 72 x 72, 96 x 96 G $\frac{1}{4}$ B -

spanner size 14

NG 144 x 144 G $\frac{1}{2}$ B -

spanner size 22

(EN 837-3/7.3)

Measuring element

Capsule element, CuBe alloy

Movement

Brass

Zero correction

From the front

Seal

„Perbunan“ nitrile rubber

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

NG 72 D1 – plastic, black

NG 96 D3 – stainless steel 1.4301

NG 144 D2 – sheet steel, black

Bezel

NG 72 plastic, black

NG 96 aluminium, black

NG 144 sheet steel, black

Front glass

Plastic

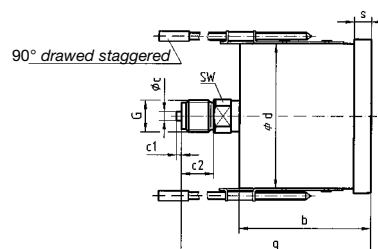
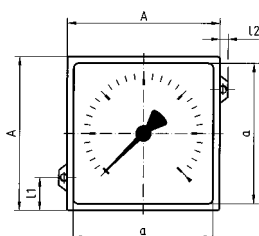
Options

- Damping screw
- Reference pointer
- Special scales

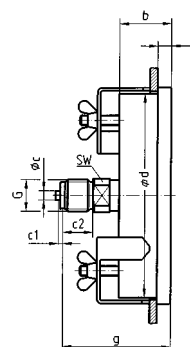
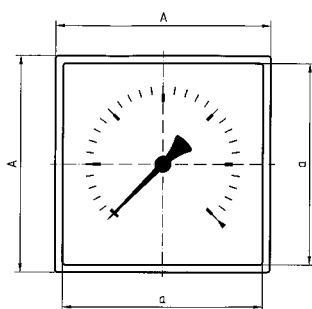
Capsule type pressure gauge with square bezel for panel mounting NG 72 x 72/96 x 96/144 x 144

Housing types and dimensions

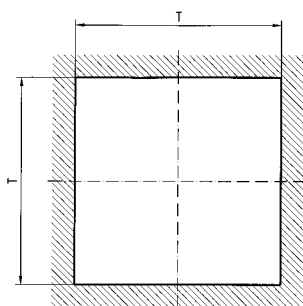
Type D1 - NG 72 x 72



Type D3 / D2 - NG 96 x 96 / 144 x 144



Panel cut out



Dimensions (mm)

Nominal size (NG)	A	a	b	Øc	c1	c2	d	G	g	l1	l2	s	SW	T										
72 x 72	72	63	63.5	5	2	13	66	G ¹ / ₄ B	86.5	17	6.5	8	14	68										
96 x 96	96	88	32	5	2	13	88	G ¹ / ₄ B	55	-	-	6.5	14	90										
144 x 144	144	134	49	6	3	20	136	G ¹ / ₂ B	81	-	-	9	22	138										

Standard capsule type pressure gauges EN 837-3

DG: M

[illegible]

Standard capsule type pressure gauges EN 837-3

DG: M

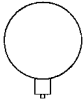
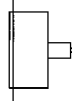
[illegible]

Standard capsule type pressure gauges EN 837-3

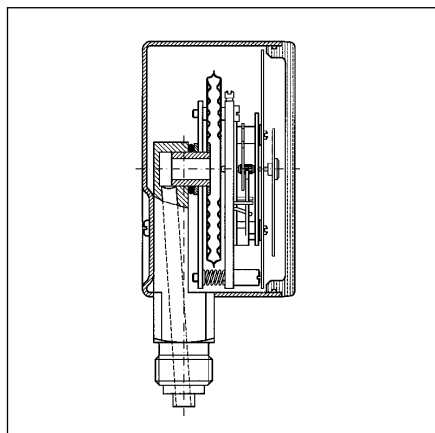
DG: M

Standard version

Panel mounting version

Type	KP160,D401	KP160,D411	KP160,D431	KP160,D451		KP72,D111	KP96,D311	KP144,D211
Version								
Housing-Ø	160	160	160	160		72 x 72	96 x 96	144 x 144
Housing	Stainless steel 1.4301 with bayonet type bezel					Plastic	Stainless steel	Sheet steel
Meas.elem.	Capsule element, CuBe alloy					Capsule element, CuBe alloy		
Accuracy class	1.6	1.6	1.6	1.6		1.6	1.6	1.6
Connection	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B		G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₂ B
			3-hole fixing, panel mounting bezel, 1.4301, polished	Panel mounting bezel 1.4301, polished, clamp fixing				
Range (mbar)	Part no.	Part no.	Part no.	Part no.		Part no.	Part no.	Part no.
Price €								
-6/0	35151401	35151411	35151431	35151451		---	---	---
-10/0	35152401	35152411	35152431	35152451		---	---	---
-16/0	35153401	35153411	35153431	35153451		---	---	---
Price €								
-25/0	35154401	35154411	35154431	35154451		35304111	35354311	35404211
-40/0	35155401	35155411	35155431	35155451		35305111	35355311	35405211
-60/0	35156401	35156411	35156431	35156451		35306111	35356311	35406211
-100/0	35157401	35157411	35157431	35157451		35307111	35357311	35407211
-160/0	35158401	35158411	35158431	35158451		35308111	35358311	35408211
-250/0	35159401	35159411	35159431	35159451		35309111	35359311	35409211
-400/0	35160401	35160411	35160431	35160451		35310111	35360311	35410211
-600/0	35161401	35161411	35161431	35161451		35311111	35361311	35411211
-1000/0	35162401	35162411	35162431	35162451		35312111	35362311	35412211
Price €								
0/6	35163401	35163411	35163431	35163451		---	---	---
0/10	35164401	35164411	35164431	35164451		---	---	---
0/16	35165401	35165411	35165431	35165451		---	---	---
Price €								
0/25	35166401	35166411	35166431	35166451		35316111	35366311	35416211
0/40	35167401	35167411	35167431	35167451		35317111	35367311	35417211
0/60	35168401	35168411	35168431	35168451		35318111	35368311	35418211
0/100	35169401	35169411	35169431	35169451		35319111	35369311	35419211
0/160	35170401	35170411	35170431	35170451		35320111	35370311	35420211
0/250	35171401	35171411	35171431	35171451		35321111	35371311	35421211
0/400	35172401	35172411	35172431	35172451		35322111	35372311	35422211
0/600	35173401	35173411	35173431	35173451		35323111	35373311	35423211
0/1000	35174401	35174411	35174431	35174451		35324111	35374311	35424211

Capsule type pressure gauge for chemical applications EN 837-3



Application

For aggressive gaseous and dry media, also for use in aggressive environments.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

63 - 100 - 160

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

0/25 to 0/1,000 mbar and all corresponding vacuum and compound ranges with overpressure protection

Application area

Static load:

full scale value

Dynamic load:

0.9 x full scale value

Overload safety:

1.3 x full scale value

Operating temperature range

Medium: $T_{max} = +100\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:
rising temp. approx. $\pm 0.6\text{ } \%/10\text{K}$
falling temp. approx. $\pm 0.6\text{ } \%/10\text{K}$
percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Stainless steel 1.4571, bottom or centre back

NG 63 G $\frac{1}{4}$ B - spanner size 14

NG 100 -160 G $\frac{1}{2}$ B -

spanner size 22

(EN 837-3/7.3)

Measuring element

Capsule element, stainless steel 1.4571

Movement

Stainless steel

Zero correction

From the front

Seal

FKM (Viton)

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

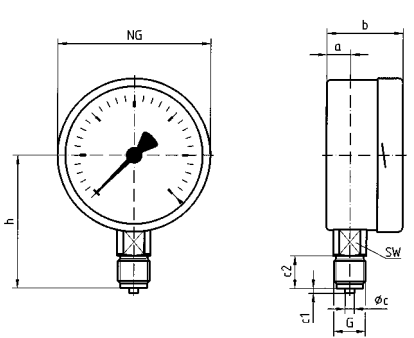
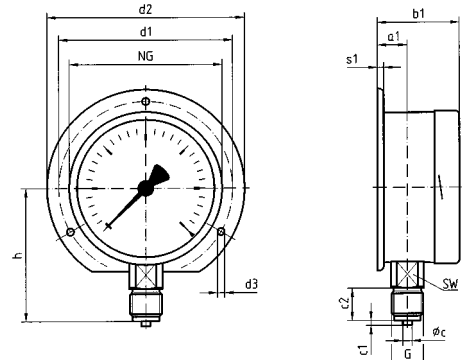
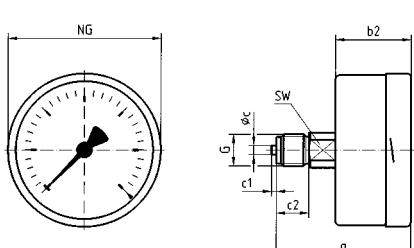
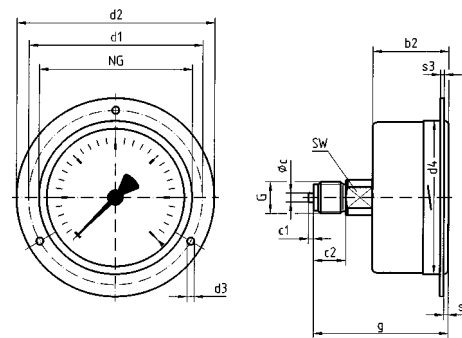
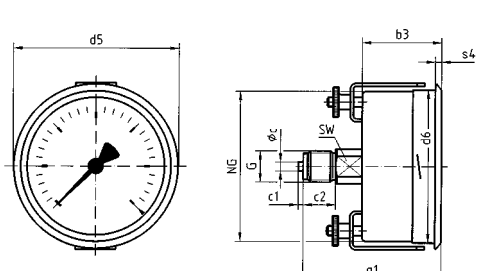
Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw
- Special scales

Capsule type pressure gauge for chemical applications

Type D 4 - NG 63/100/160

Housing types and dimensions

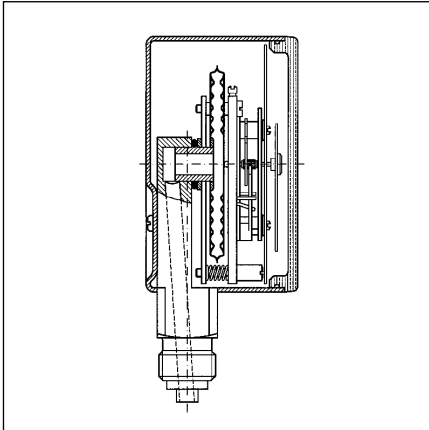
<i>Bottom connection</i> 	<i>Bottom connection, back flange</i> 
<i>Centre back connection</i> 	<i>Centre back connection, 3-hole fixing, panel mounting bezel</i> 
<i>Centre back connection, panel mounting bezel for clamp fixing</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	G	g	g1	h	s1	s2
63	10.8	13.4	40	42.1	37	37	5	2	13	75	85	3.5	64	68	64	G1/4B	60	60	53	5.2	3
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	G1/2B	81	81	86	5.5	4
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	G1/2B	82	84	116	6	4
Nominal size (NG)	s3	s4	SW																		
63	2	3	14																		
100	2	4	22																		
160	2	4.5	22																		

* Dimensions for NG 100 according to DIN EN 837-3

Precision capsule type pressure gauges class 0.6



Application

For gaseous, dry media which do not attack copper alloys. For high measuring accuracy.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

160

Accuracy class (EN 837-3/6)

0.6

Ranges (EN 837-3/5)

0/40 to 0/1,000 mbar and all corresponding vacuum and compound ranges with overpressure protection

Calibration medium

Air

Application area

Static load:

full scale value

Dynamic load:

0.9 x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.6\text{ } \%$ /10K

falling temp. approx. $\pm 0.6\text{ } \%$ /10K

percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Brass, bottom or centre back
G $\frac{1}{2}$ B - spanner size 22

(EN 837-3/7.3)

Measuring element

Capsule element, CuBe alloy

Movement

Brass

Zero correction

From the front

Seal

„Perbunan“ nitrile rubber

Dial

Aluminium, white

Dial marking black

Pointer

Knife edge pointer

Aluminium, black

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

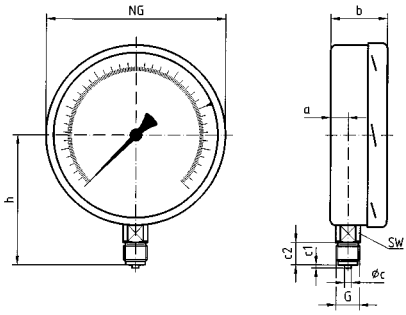
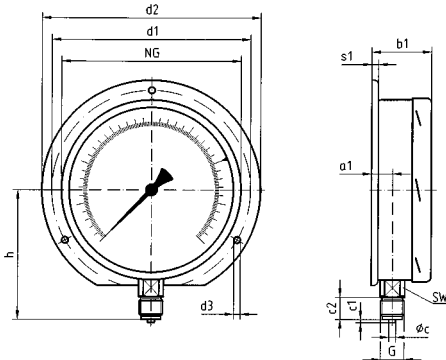
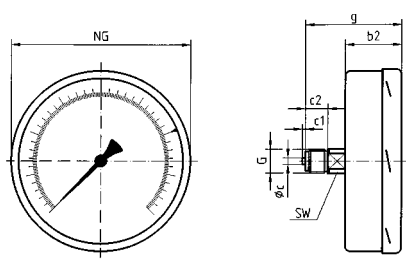
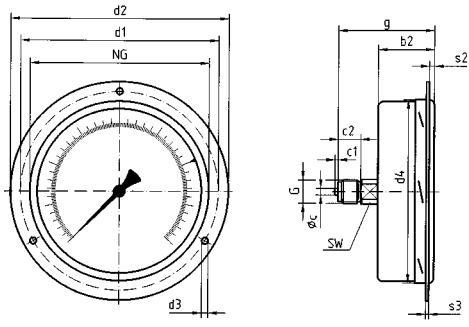
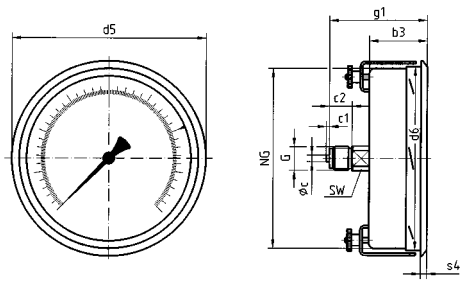
Plastic (PMMA)

Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw

Precision capsule type pressure gauges class 0.6

Type D 4 - NG 160 - Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom connection, back flange</i> 
<i>Centre back connection</i> 	<i>Centre back connection, 3-hole fixing, panel mounting bezel</i> 
<i>Centre back connection, panel mounting bezel for clamp fixing</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1	d2	d3	d4	d5	d6	G	g	g1	h	s1	s2
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	G ¹ / ₂ B	82	84	116	6	4
Nominal size (NG)	s3	s4	SW																		
160	2	4.5	22																		

DG: M

DG: M

Refer to page 248 for additional costs

Additional costs for capsule type pressure gauges

DG: M

Housing diameter (mm)	63	80	100	160
Description	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
Overpressure safety 10x FSD for ranges ≥ 25 mbar (only for measuring element Ms/CuBe, only for gauges with bayonet type bezel)	38192	---	38194	38195
Overpressure and underpressure safety 10x FSD for ranges ≥ 25 mbar (only for measuring system Ms/CuBe, only for gauges with bayonet type bezel)	38197	---	38199	38200
Accuracy class 1.0	---	---	38180	38181
3-hole fixing, panel mounting bezel, stainless steel 1.4301 (only for gauges with bayonet type bezel, also for bottom connection)	37608	---	37609	37610
Back flange, stainless steel 1.4301, bare metal surface (only for gauges with stainless steel housing)	38048	38049	38050	38051
Housing gloss polished (only stainless steel housing)	37611	37612	37613	37614
Bayonet type bezel gloss polished	38052	---	38053	38055
Laminated safety front glass (only for gauges with bayonet type bezel)	38072	---	38074	38075
Connection socket nickel plated/polished	38084	38085	38086	38087
Connection socket with special thread	on request	on request	on request	on request
Damping screw brass - hole 0.3 - 0.5 - 0.7 mm (please specify)	38097	38098	38099	38100
Damping screw stainless steel - hole 0.3 - 0.5 - 0.7 mm (please specify)	38103	38104	38105	38106
Red mark on dial	38184	38185	38186	38187
1 reference pointer red - external screwdriver adjustment (front glass = plastic)	38115	38116	38117	---
1 reference pointer red - external knob adjustment (front glass = plastic)	38188	38189	38190	38191
Max pointer - for ranges greater than 0/250 mbar (only for gauges without glycerine filling, not possible for overpressure safety 10 x FSD or overpressure/underpressure safety 10 x FSD)	38127	38128	38129	38130
Knife edge pointer	38133	38134	38135	38136
Special mounting position	38147	38148	38149	38150
Oil and grease removed from wetted parts (not for oxygen!), label „Oil and grease free“ (only for stainless steel movement)	37615	37616	37617	37618
Glycerine filling (only for pressure gauges for chemical applications, for range 0/60 mbar and greater, accuracy class 2.5)	37619	---	37620	37621
Higher protection IP 54 (only for gauges with bayonet type bezel)	---	---	38160	---
Printing block costs per scale and colour (scale design as per EN 837-3, others on request)	38153	38154	38155	38156
Printing costs per additional colour	38165	38166	38167	38168

Refer to „Accessories for panel mounting and wall mounting“ on page 383.

Bourdon tube pressure gauges for heating/plumbing applications with self-sealing connection thread



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Nominal size

50 - 63 - 80 - 100

Accuracy class (EN 837-1/6)

NG 50 - 80: 2.5

NG 100: 1.6

Ranges (EN 837-1/5)

0/0.6 to 0/25 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Self-sealing thread with PTFE ring for safe and fast installation
 (Attention: 60° chamfer required at female thread)

Brass, bottom or back
 NG 50-063 $G^{1/4}B$ - spanner size 14
 NG 80-100 $G^{1/2}B$ - spanner size 22

Measuring element

Bourdon tube element, copper alloy
 „C“ type bourdon tube

Movement

Brass

Dial

Plastic, white

Dial marking black

Pointer

Plastic, black

Housing

Black ABS, highly impact resistant and corrosion resistant

Front glass

Clip-in plastic

NG 80-100 with adjustable red reference pointer

Special versions

Pressure gauge for heating installations NG 50-63-80

for sealed heating systems

Range 0/4 bar

Connection NG 50 $G^{1/4}B$ bottom back

NG 63 $G^{1/4}B$ or $G^{3/8}B$

bottom or centre back

NG 80 $G^{1/2}B$ bottom or

$G^{1/4}B$ centre back

(with valve $G^{1/4} \times G^{1/2}$)

Dial with red mark at 3 bar and

green sector from 1.5 to 3 bar

Front glass with adjustable red

reference pointer and green flag

Hydrometer NG 100

Water level indicator for standard heating systems

Ranges 0/0.6 to 0/10 bar

Connection $G^{1/2}B$ bottom

Dual scale, bar outer scale, black,

metres water column

inner scale, black

Front glass with adjustable red reference pointer

Accessories

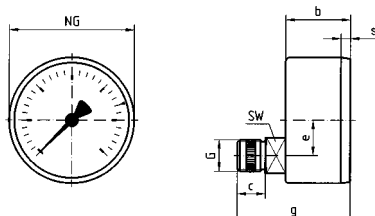
Mounting valves

with self-sealing coating, automatically close during replacement of gauge to enable fast and cost effective servicing (refer to page 388 „Accessories for pressure gauges“).

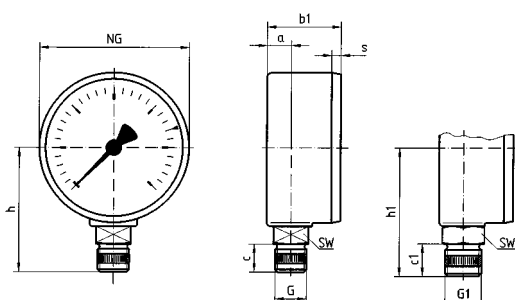
Bourdon tube pressure gauges for heating/plumbing applications with self-sealing connection thread

Housing types and dimensions

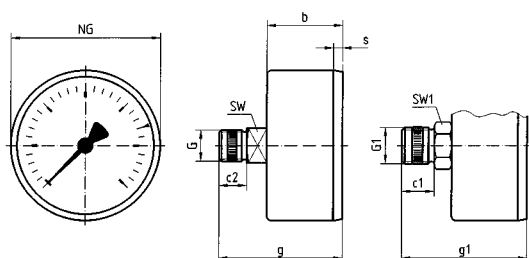
HZ 50 – bottom back connection



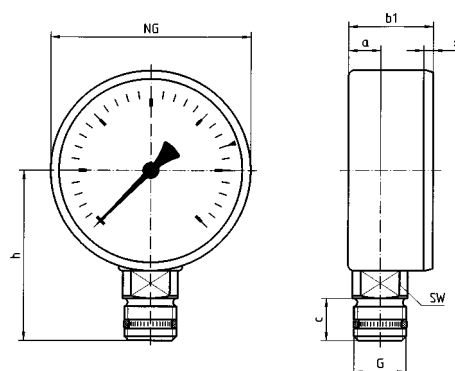
RF 63/HZ 63 – bottom connection



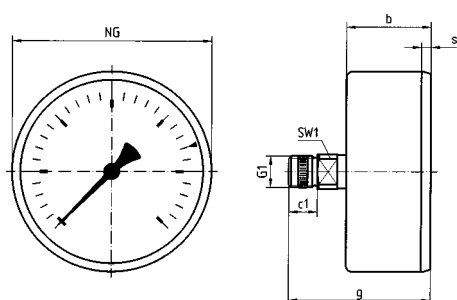
RF/HZ 63 – centre back connection



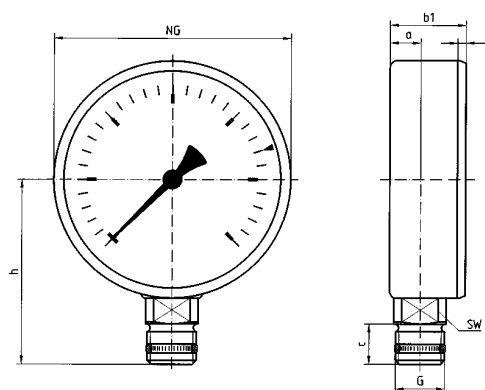
RF 80/HZ 80 – bottom connection



RF 80/HZ 80 – centre back connection



RF 100/HY 100 – bottom connection



Dimensions (mm)

Nominal size (NG)	a	b	b1	c	c1	c2	e	g	g1	G*	G1*	h	h1	s	SW	SW1
50	-	25.8	-	11.2	-	-	14	43	-	G ¹ / ₄ B	-	-	-	3.8	14	-
63	9.8	30.4	29.7	11.2	13	11.5	-	49.9	50.4	G ¹ / ₄ B	G ³ / ₈ B	49	51.5	3.7	14	17
80	12.8	32.8	32.8	17	11.5	-	-	55.8	-	G ¹ / ₂ B	G ¹ / ₄ B	68	-	2.8	22	14
100	15.5	34.5	-	17	-	-	-	-	-	G ¹ / ₂ B	-	78	-	3.5	22	-

* Attention: approx. 60° chamfer required at female thread

Bourdon tube pressure gauges for heating/ plumbing applications

DG: G

Type	RF 50 bottom	RF 50 back	RF 63 bottom	RF 63 back	RF 80 bottom	RF 100 bottom	HY 100 bottom	
Version								
Housing-Ø	50	50	63	63	80	100	100	
Housing	Black ABS, highly impact resistant and corrosion resistant							
Meas. elem.	Bourdon tube element, copper alloy							
Accuracy class	2.5	2.5	2.5	2.5	2.5	1.6	1.6	
Connection	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	
Thread	Self-sealing with PTFE sealing ring							
					With adjustable red reference pointer		Dual scale bar / mWC	
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	
Price €								
-1/0	---	---	---	---	---	---	---	
0/0,6	---	---	---	---	---	---	63281	
0/1	---	---	---	---	---	---	63282	
0/1,6	---	---	---	---	---	63610	63283	
0/2,5	---	---	63511	63536	63561	63611	63284	
0/4	---	---	63512	63537	63562	63612	63285	
0/6	63122	63127	63513	63538	63563	63613	63286	
0/10	63123	63128	63514	63539	63564	63614	63287	
0/16	63124	63129	63515	63540	63565	63615	---	
0/25	---	---	---	---	63566	63616	---	
Type	HZ 50 back	HZ 63 bottom	HZ 63 back	HZ 63 bottom	HZ 63 back	HZ 80 bottom	HZ 80 back	
Version								
Housing-Ø	50	63	63	63	63	80	80	
Housing	Black ABS, highly impact resistant and corrosion resistant							
Meas. elem.	Bourdon tube element, copper alloy							
Range	0/4 bar							
Dial	with red mark at 3 bar and green sector from 1.5 to 3 bar							
Front glass	with adjustable red reference pointer and green flag							
Accuracy class	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Connection	G ¹ / ₄ B	G ³ / ₈ B	G ³ / ₈ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₂ B	G ¹ / ₄ with valve G ¹ / ₄ x G ¹ / ₂	
Thread	Self-sealing with PTFE sealing ring							
Price €								
Part no.	63927	63910	63914	63911	63915	63918	63919	

Combined thermometer – pressure gauge/ thermo-hydrometer



TM 63



Application

For liquid media which are not highly viscous, do not crystallize and do not attack copper alloys. For combined measurement of pressure and temperature, especially in heating systems and heating boilers.

Description

The combined thermometer-pressure gauge/thermo-hydrometer consists of a Bourdon tube system for pressure measurement and a bimetal system for simultaneous temperature measurement. Both values are measured and displayed by a single gauge. A self-closing mounting valve enables easy replacement of the gauge without having to drain the system. An optional M 18 x 1 to G¹/₄ adapter is available if the combined thermometer-pressure gauge has to be mounted into an existing thermo-well with M 18 x 1 female thread.

Type

D1/D2

Nominal size

63 - 80

Accuracy class

Pressure gauge/hydrometer:
2.5 (EN 837-1/6)

Thermometer:
2 (EN 13190)



Application area

Pressure gauge/hydrometer:

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Thermometer:

20/120 °C

Ranges

Pressure gauge/hydrometer:

0/4 bar and 0/6mWS to 0/60 mWS

Thermometer:

20/120 °C

Operating temperature range

Medium: $T_{max} = +120$ °C

Ambient: $T_{min} = -20$ °C

$T_{max} = +60$ °C

Temperature performance

Pressure gauge/hydrometer:

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. ± 0.4 %/10K

falling temp. approx. ± 0.4 %/10K

percentage of full scale value

Protection

IP 32 (EN 60529)

TH 80



Standard version

Connection

Brass, centre back

G¹/₄B

with mounting valve G¹/₄ to R¹/₂

Measuring element

Pressure: Bourdon tube element, copper alloy

Temperature: bimetal element

Dial

Plastic, white

Dial marking black

with red/blue circular arcs

Pointer

Pressure gauge/hydrometer:

Plastic, black

Thermometer:

Plastic, red

Housing

D1 - plastic

D2 - black sheet steel

Front glass

Clip-in plastic with adjustable red mark

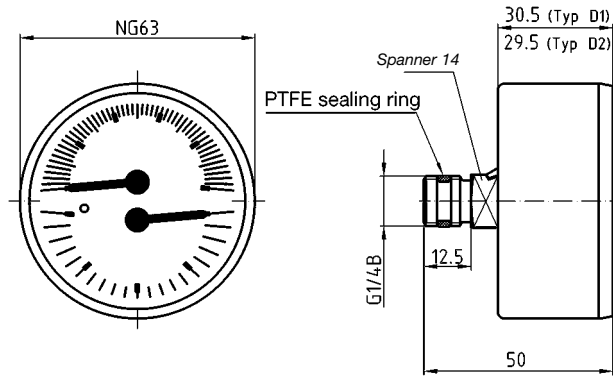
Options

- Adapter M 18 x 1 to G¹/₄
- Special scales

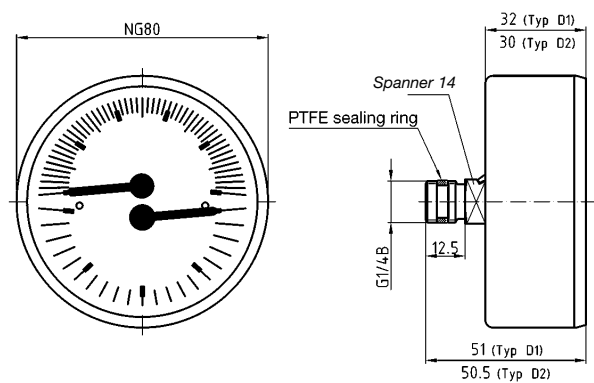
Combined thermometer – pressure gauge/ thermo-hydrometer



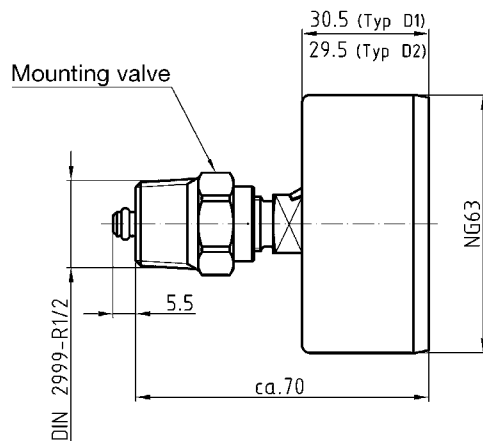
TM 63



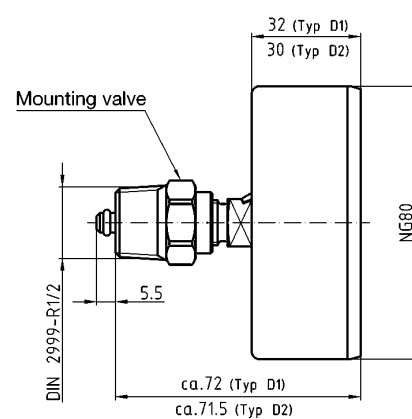
TM 80



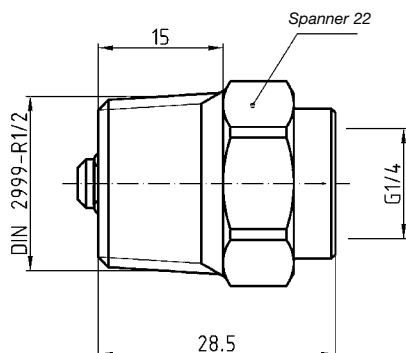
TM 63 with mounting valve



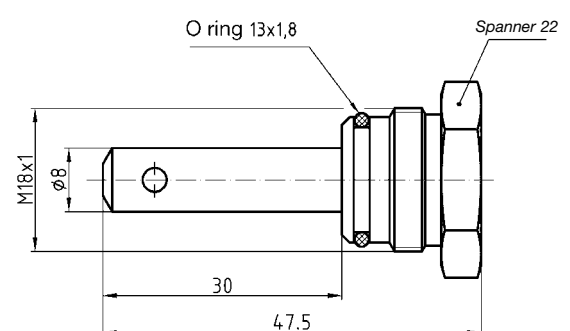
TM 80 with mounting valve



Mounting valve



Adapter



Combined thermometer – pressure gauge/ thermo-hydrometer



DG: G

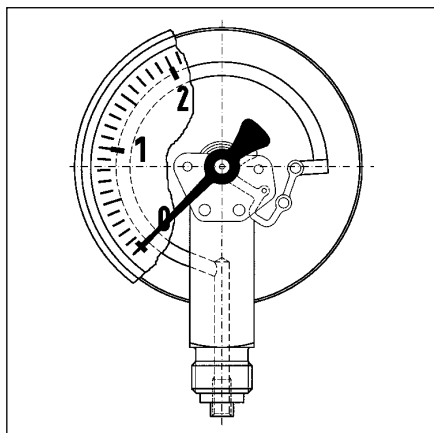
Type	TM 63,D211	TM 63,D211		TM 80,D111	TM 80,D211	TM 80,D211	TH 80,D211
Version							
Housing-Ø	63	63		80	80	80	80
Housing	Black steel sheet			Plastic	Black steel sheet		
Accuracy class	Pressure gauge/hydrometer 2.5 – thermometer 2						
Connection	G1/4B with mounting valve G1/4 to R1/2						
Adapter	without	with		without	without	with	without
Range	Part no.	Part no.		Part no.	Part no.	Part no.	Part no.
Price €							
0/4 bar 20/120 °C	63318	63346		63317	63341	63348	---
Range							
0/6 mWS 20/120 °C	---	---		---	---	---	63311
0/10 mWS 20/120 °C	---	---		---	---	---	63312
0/16 mWS 20/120 °C	---	---		---	---	---	63313
0/25 mWS 20/120 °C	---	---		---	---	---	63314
0/40 mWS 20/120 °C	---	---		---	---	---	63315
0/60 mWS 20/120 °C	---	---		---	---	---	63316

Minimum order quantity for non-stock items = 100 pieces

Spare parts

DG: G	Part no.	Price €
Mounting valve G ¹ / ₄ to R ¹ / ₂ , brass	05 00 25 12	
Adapter G ¹ / ₄ to M 18 x 1, brass	05 00 40 01	

Standard Bourdon tube pressure gauges EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 1

Nominal size

40 - 50 - 63 - 80 - 100

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Brass, bottom or centre back

NG 40 $G^{1/8}B$ - spanner size 12

NG 50-63 $G^{1/4}B$ - spanner size 14

NG 80-100 bottom $G^{1/2}B$ -

spanner size 22

NG 80-100 centre back $G^{1/4}B$ -

spanner size 14 (EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Plastic, white

Dial marking black

Pointer

Plastic, black

Housing

Black ABS, highly impact resistant

and corrosion resistant

Front glass

Clip-in plastic

NG 80-100 with adjustable red re-

ference pointer

Options

- Damping screw
- Reference pointer

Standard Bourdon tube pressure gauges

Type D 1 - NG 40/50/63/80/100

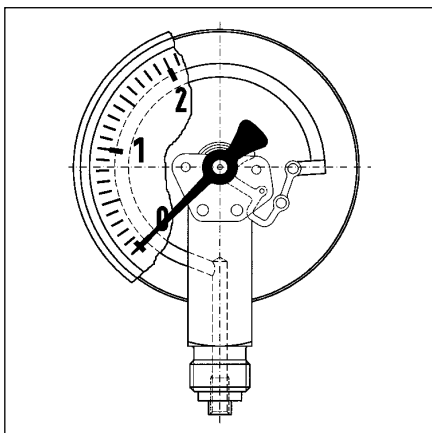
Housing types and dimensions

NG 40/50/63 – Bottom connection	NG 40/50/63 – Centre back connection
NG 80 – Bottom connection	NG 80 – Centre back connection
NG 100 – Bottom connection	NG 100 – Centre back connection

Dimensions (mm)

Nominal size (NG)	a	b	b ₁	Øc	c ₁	c ₂	Øe	e ₁	e ₂	g	G	G ₁	h	s	SW	SW ₁
40	9.5	25	25	4	2	10	-	-	-	41.5	G ¹ / ₈ B	G ¹ / ₈ B	36	3	12	-
50	10.3	26.8	27.1	5	2	13	-	-	-	47.1	G ¹ / ₄ B	G ¹ / ₄ B	45	3.8	14	-
63	9.8	29.7	30.4	5	2	13	-	-	-	50.4	G ¹ / ₄ B	G ¹ / ₄ B	51.5	3.7	14	-
80	12.8	32.8	32.8	6	3	20	5	2	13	55.8	G ¹ / ₂ B	G ¹ / ₄ B	72	2.8	22	14
100	15.5	34.5	32	6	3	20	5	2	13	55	G ¹ / ₂ B	G ¹ / ₄ B	82	3.5	22	14

Standard Bourdon tube pressure gauges EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 2/D 3

Nominal size

40 - 50 - 63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

percentage of full scale value

Protection

IP 32 (EN 60 529)

Standard version

Connection

Brass, bottom or centre back

NG 40 G $\frac{1}{8}$ B - spanner size 12

NG 50-63 G $\frac{1}{4}$ B - spanner size 14 (EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Plastic, white

Dial marking black

Pointer

Plastic, black

Housing

D 2 - black sheet steel

D 3 - stainless steel 1.4301

Front glass

Clip-in plastic

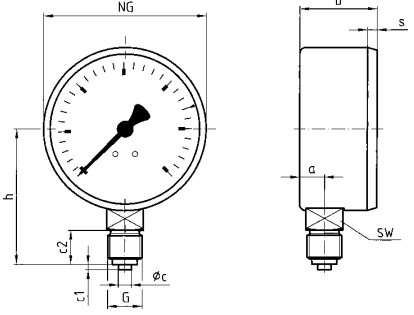
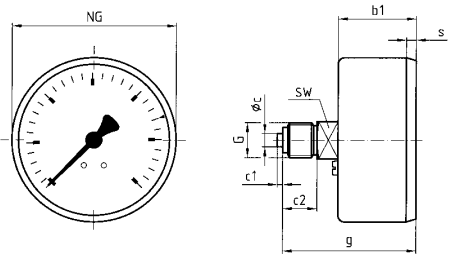
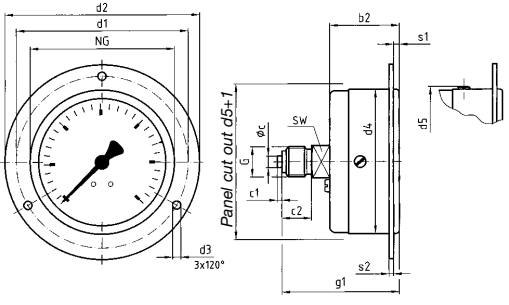
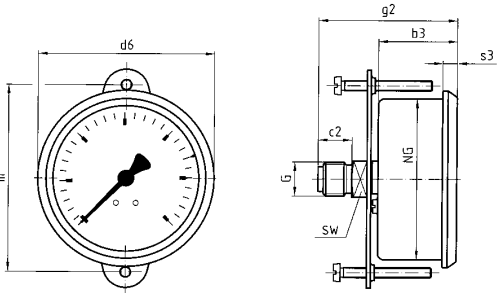
Options

- Panel mounting bezel for clamp fixing
- 3-hole fixing panel mounting bezel
- Damping screw
- Reference pointer

Standard Bourdon tube pressure gauges

Type D 2/D 3 - NG 40/50/63

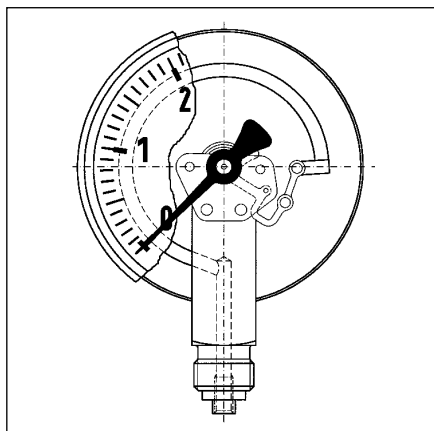
Housing types and dimensions

<i>Bottom connection</i> 	<i>Centre back connection</i> 
<i>Centre back connection, 3-hole fixing, panel mounting bezel</i> 	<i>Centre back connection, panel mounting bezel for clamp fixing</i> 

Dimensions (mm)

Nominal size (NG)	a	b	b1	b2	b3	Øc	c1	c2	d1	d2	d3	d4	d5	d6	g	g1	g2	G	h	m
40	8.5	23.5	25	26	28	4	2	10	51	61	3.6	41	45	44	41.5	42.5	46.6	G ¹ / ₈ B	36	50
50	10.5	26	26	27.5	30.3	5	2	13	60	71	3.6	50	54	54	47	49	51.3	G ¹ / ₄ B	45	58
63	9.5	29.4	29.4	30.3	30.3	5	2	13	75	85	3.6	63	66.5	67.8	50.4	51.3	53.3	G ¹ / ₄ B	51.5	72
Nominal size (NG)	s	s1	s2	s3	SW															
40	3	2.5	2	5.2	12															
50	3.8	2.5	2	5.4	14															
63	3.7	2.5	2	5.6	14															

Standard Bourdon tube pressure gauges EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 2

Nominal size

80 - 100

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 32 (EN 60 529)

Standard version

Connection

Brass, bottom:

NG 80 - 100 G $\frac{1}{2}$ B - spanner size 22

Brass, centre back

NG 80 - 100 G $\frac{1}{4}$ B - spanner size 14

(EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Plastic, white

Dial marking black

Pointer

Plastic, black

Housing

Sheet steel, black

Front glass

Clip-in plastic with adjustable red reference pointer

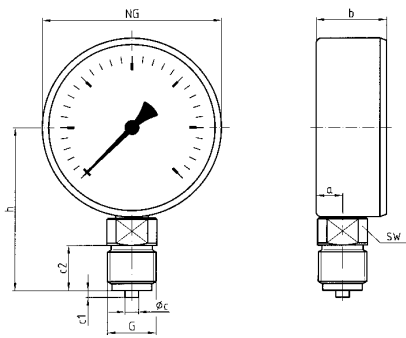
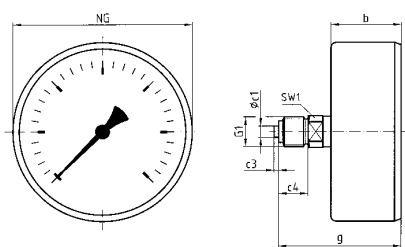
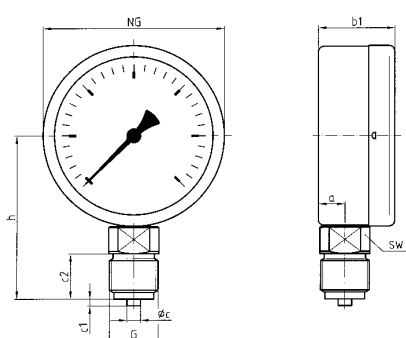
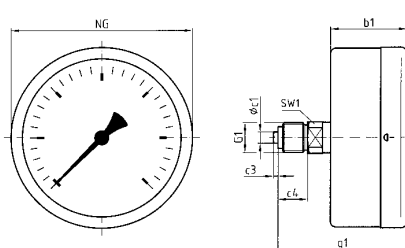
Options

- Stainless steel housing (NG 100)
- Push on bezel
- Instrument grade front glass
- 3-hole fixing, panel mounting bezel
- Damping screw
- Reference pointer

Standard Bourdon tube pressure gauges

Type D 2 - NG 80/100

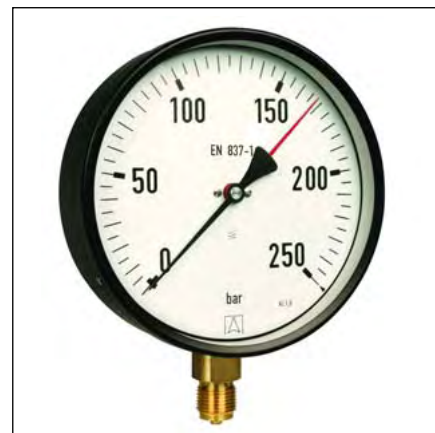
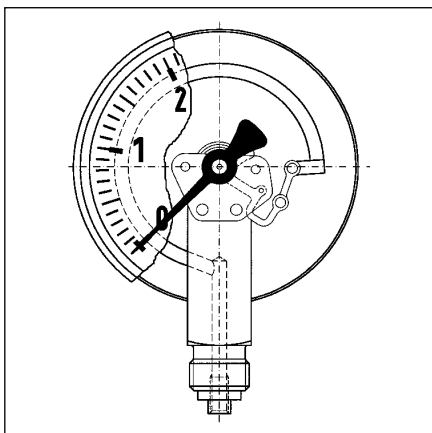
Housing types and dimensions (in mm)

<i>Bottom connection</i> 	<i>Centre back connection</i> 
<i>Bottom connection, with push-on bezel</i> 	<i>Centre back connection, with push-on bezel</i> 

Dimensions (mm)

Nominal size (NG)	a	b	b1	Øc	c1	c2	Øc1	c3	c4	g	g1	G	G1	h	SW	SW1
80	11.7	31	33.5	6	3	20	5	2	13	54	56.5	G1/2B	G1/4B	72	22	14
100	11	29.5	34	6	3	20	5	2	13	52.5	57	G1/2B	G1/4B	82	22	14

Standard Bourdon tube pressure gauges EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 2

Nominal size

160

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 32 (EN 60 529)

Standard version

Connection

Brass, bottom:

G $\frac{1}{2}$ B - spanner size 22

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Aluminium, white

Dial marking black

with adjustable red reference pointer

Pointer

Aluminium, black

Housing

Sheet steel, black

Push-on bezel

Sheet steel, black

Front glass

Instrument glass

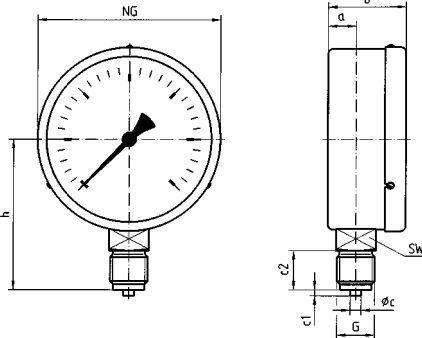
Options

- Damping screw
- Reference pointer

Standard Bourdon tube pressure gauges

Type D 2 - NG 160

Housing types and dimensions

Bottom connection	
	

Dimensions (mm)

Nominal size (NG)	a	b	Øc	c1	c2	G	h	SW											
160	15.5	50	6	3	20	G1/2B	116	22											

Standard Bourdon tube pressure gauges EN 837-1

DG: M

Type	RF40,D201	RF40,D211	RF40,D231*	RF40,D251*	RF50,D201	RF50,D211	RF50,D231*	RF50,D251*
Version								
Housing-Ø	40	40	40	40	50	50	50	50
Housing	Black sheet steel, plastic, clip-in front glass							
Meas. elem.	Bourdon tube element, copper alloy							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G ¹ / ₈ B	G ¹ / ₈ B	G ¹ / ₈ B	G ¹ / ₈ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B
			3-hole fixing, panel mounting bezel, chrome plated	Panel mounting bezel, chrome plated, clamp fixing			3-hole fixing, panel mounting bezel, chrome plated	Panel mounting bezel, chrome plated, clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85001201	85001211	85001231	85001251	85051201	85051211	85051231	85051251
-1/+0,6	---	---	---	---	---	---	---	---
-1/+1,5	---	---	---	---	---	---	---	---
-1/+3	---	---	---	---	---	---	---	---
-1/+5	---	---	---	---	---	---	---	---
-1/+9	---	---	---	---	---	---	---	---
-1/+15	---	---	---	---	---	---	---	---
Price €								
0/1	85010201	85010211	85010231	85010251	85060201	85060211	85060231	85060251
0/1,6	85011201	85011211	85011231	85011251	85061201	85061211	85061231	85061251
0/2,5	85012201	85012211	85012231	85012251	85062201	85062211	85062231	85062251
0/4	85013201	85013211	85013231	85013251	85063201	85063211	85063231	85063251
0/6	85014201	85014211	85014231	85014251	85064201	85064211	85064231	85064251
0/10	85015201	85015211	85015231	85015251	85065201	85065211	85065231	85065251
0/16	85016201	85016211	85016231	85016251	85066201	85066211	85066231	85066251
0/25	85017201	85017211	85017231	85017251	85067201	85067211	85067231	85067251
0/40	85018201	85018211	85018231	85018251	85068201	85068211	85068231	85068251
Price €								
0/60	85019201	85019211	85019231	85019251	85069201	85069211	85069231	85069251
0/100	85020201	85020211	85020231	85020251	85070201	85070211	85070231	85070251
0/160	85021201	85021211	85021231	85021251	85071201	85071211	85071231	85071251
0/250	85022201	85022211	85022231	85022251	85072201	85072211	85072231	85072251
0/400	---	---	---	---	85073201	85073211	85073231	85073251

* Dual scale, bar outer, black, psi inner, red
Minimum order quantity for non-stock items = 100 pieces

Standard Bourdon tube pressure gauges EN 837-1

DG: M

Type	RF63,D201	RF63,D211	RF63,D231*	RF63,D251*	RF80,D201	RF100,D201	RF100,D211	RF160,D201
Version								
Housing-Ø	63	63	63	63	80	100	100	160
Housing	Black sheet steel, plastic, clip-in front glass							Push on bezel
Meas. elem.	Bourdon tube element, copper alloy							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₄ B	G ¹ / ₂ B
			3-hole fixing, panel mounting bezel, chrome plated	Panel mounting bezel, chrome plated, clamp fixing	with adjustable red reference pointer			
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85101201	85101211	85101231	85101251	85151201	85201201	85201211	85251201
-1/+0,6	85102201	85102211	85102231	85102251	85152201	85202201	85202211	85252201
-1/+1,5	85103201	85103211	85103231	85103251	85153201	85203201	85203211	85253201
-1/+3	85104201	85104211	85104231	85104251	85154201	85204201	85204211	85254201
-1/+5	85105201	85105211	85105231	85105251	85155201	85205201	85205211	85255201
-1/+9	85106201	85106211	85106231	85106251	85156201	85206201	85206211	85256201
-1/+15	85107201	85107211	85107231	85107251	85157201	85207201	85207211	85257201
Price €								
0/0,6	85109201	85109211	85109231	85109251	85159201	85209201	85209211	85259201
0/1	85110201	85110211	85110231	85110251	85160201	85210201	85210211	85260201
0/1,6	85111201	85111211	85111231	85111251	85161201	85211201	85211211	85261201
0/2,5	85112201	85112211	85112231	85112251	85162201	85212201	85212211	85262201
0/4	85113201	85113211	85113231	85113251	85163201	85213201	85213211	85263201
0/6	85114201	85114211	85114231	85114251	85164201	85214201	85214211	85264201
0/10	85115201	85115211	85115231	85115251	85165201	85215201	85215211	85265201
0/16	85116201	85116211	85116231	85116251	85166201	85216201	85216211	85266201
0/25	85117201	85117211	85117231	85117251	85167201	85217201	85217211	85267201
0/40	85118201	85118211	85118231	85118251	85168201	85218201	85218211	85268201
Price €								
0/60	85119201	85119211	85119231	85119251	85169201	85219201	85219211	85269201
0/100	85120201	85120211	85120231	85120251	85170201	85220201	85220211	85270201
0/160	85121201	85121211	85121231	85121251	85171201	85221201	85221211	85271201
0/250	85122201	85122211	85122231	85122251	85172201	85222201	85222211	85272201
0/400	85123201	85123211	85123231	85123251	85173201	85223201	85223211	85273201

* Dual scale, bar outer, black, psi inner, red
Minimum order quantity for non-stock items = 100 pieces

Refer to page 266 for additional costs.

Division II 265

Additional costs for standard Bourdon tube pressure gauges

DG: M

Housing diameter (mm)	40	50	63	80	100	160
Description	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
Housing nickel/chrome plated (instead of steel housing)	38064	38065	38066	---	---	---
Push-on bezel nickel/chrome plated side screw fixing (NS 160, instead of black bezel)	38250	38251	38252	38253	38254	38255
Stainless steel 1.4301 housing, vibration ground finish (instead of steel housing)	38256	38257	38258	---	38300	---
Stainless steel 1.4301 housing, polished (instead of steel housing)	38259	38260	38261	---	38314	---
Push-on bezel stainless steel 1.4301, polished side screw fixing	38262	38263	38264	---	---	---
3-hole fixing, panel mounting bezel, black, side screw fixing	---	---	---	---	38266	38267
3-hole fixing, panel mounting bezel, chrome plated, side screw fixing	---	---	---	---	38269	38270
Back flange, black sheet steel (only for steel housing)	---	---	---	---	38044	38045
Connection socket nickel/chrome plated	38082	38083	38084	38085	38086	38087
Connection socket with special thread	on request	on request	on request	on request	on request	on request
Damping screw brass - hole 0.3 - 0.5 - 0.7 mm (please specify)	38095	38096	38097	38098	38099	38100
Red mark on dial	38182	38183	38184	38185	38186	38187
1 reference pointer, red, printed on front glass	38315	38316	38109	Standard	Standard	---
2 reference pointers, red, on dial, adjustable	---	---	---	---	38123	---
Printing block costs per scale and colour (scale design as per EN 837-1, others on request)	38151	38152	38153	38154	38155	38156
Printing costs per additional colour	38163	38164	38165	38166	38167	38168

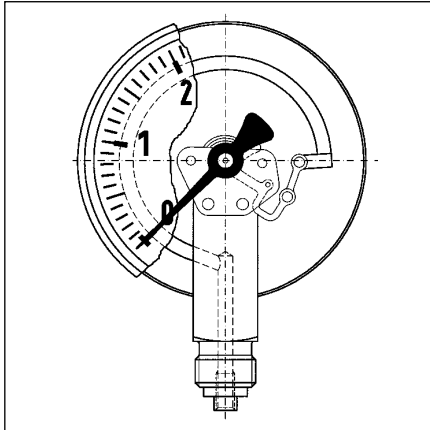
* Minimum order quantity for non-stock items = 100 pieces per version and per delivery

Spare front glass for standard Bourdon tube pressure gauges

DG: M

Housing diameter (mm)	40	50	63	80	100	160
Description	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
Plastic front glass, clip-in, for plastic housing	38285	38271	38272	38273	38274	---
Plastic front glass, clip-in, for steel housing	38275	38276	38277	38317	38318	---
Instrument grade front glass for steel housing	---	---	---	38278	38279	38280

Bourdon tube pressure gauges for industrial applications EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

For high measuring accuracy.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Types

D 2/D 3

Nominal size

100

Accuracy class (EN 837-1/6)

1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/1,000 bar

Application area

Static load:

≤ 600 bar = full scale value

> 600 bar = $\frac{3}{4}$ x full scale value

Dynamic load:

≤ 600 bar = 0.9 x full scale value

> 600 bar = $\frac{2}{3}$ x full scale value

Short term:

≤ 600 bar = 1.3 x full scale value

> 600 bar = full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 32 (EN 60 529)

Standard version

Connection

Brass, bottom or bottom back

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Measuring element

Bourdon tube element,

≤ 60 bar „C“ type bourdon tube,

copper alloy

> 60 bar helical tube, stainless steel

1.4571

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

D 2 - black sheet steel

D 3 - stainless steel 1.4301

Front glass

Clip-in plastic

Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw
- Reference pointer
- Electrical contacts

Bourdon tube pressure gauges for industrial applications *Type D 2/D 3 - NG 100*

Housing types and dimensions

<i>Bottom connection</i>	<i>Bottom connection, back flange</i>
<i>Bottom back connection</i>	<i>Bottom back connection, 3-hole fixing, panel mounting bezel</i>
<i>Bottom back connection, panel mounting bezel for clamp fixing</i>	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1	d2	d3	d4	d5	d6	e	G	g	g1	g2	h
100	15.6	19.1	44	47.5	45.6	47	6	3	20	116	132	4.8	101	105	107	26.5	G ¹ / ₂ B	76	77.6	79	86
Nominal size (NG)	s	s1	s2	s3	s4	SW															
100	3.5	5.5	3.5	2	4.5	22															

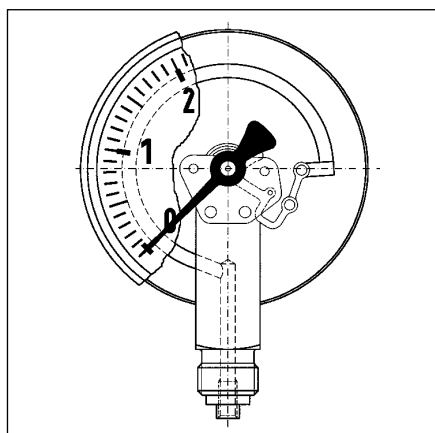
Bourdon tube pressure gauges for industrial applications EN 837-1

DG: M

Type	RF100 I,D201	RF100 I,D211	RF100 I,D221		RF100 I,D301	RF100 I,D311	RF100 I,D331	RF100 I,D351
Version								
Housing-Ø	100	100	100		100	100	100	100
Housing	Black sheet steel, plastic clip-in front glass				Stainless steel 1.4301 plastic clip-in front glass			
Meas. elem.	Bourdon tube, copper alloy (> 60 bar stainless steel 1.4571)							
Accuracy class	1.0	1.0	1.0		1.0	1.0	1.0	1.0
Connection	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B		G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B
			3-hole fixing, panel mounting bezel, black				3-hole fixing, panel mounting bezel, chrome plated	Panel mounting bezel, chrome plated clamp fixing
Range (bar)	Part no.	Part no.	Part no.		Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85301201	85301211	85301221		85301301	85301311	85301331	85301351
-1/+0,6	85302201	85302211	85302221		85302301	85302311	85302331	85302351
-1/+1,5	85303201	85303211	85303221		85303301	85303311	85303331	85303351
-1/+3	85304201	85304211	85304221		85304301	85304311	85304331	85304351
-1/+5	85305201	85305211	85305221		85305301	85305311	85305331	85305351
-1/+9	85306201	85306211	85306221		85306301	85306311	85306331	85306351
-1/+15	85307201	85307211	85307221		85307301	85307311	85307331	85307351
Price €								
0/0,6	85309201	85309211	85309221		85309301	85309311	85309331	85309351
0/1	85310201	85310211	85310221		85310301	85310311	85310331	85310351
0/1,6	85311201	85311211	85311221		85311301	85311311	85311331	85311351
0/2,5	85312201	85312211	85312221		85312301	85312311	85312331	85312351
0/4	85313201	85313211	85313221		85313301	85313311	85313331	85313351
0/6	85314201	85314211	85314221		85314301	85314311	85314331	85314351
0/10	85315201	85315211	85315221		85315301	85315311	85315331	85315351
0/16	85316201	85316211	85316221		85316301	85316311	85316331	85316351
0/25	85317201	85317211	85317221		85317301	85317311	85317331	85317351
0/40	85318201	85318211	85318221		85318301	85318311	85318331	85318351
Price €								
0/60	85319201	85319211	85319221		85319301	85319311	85319331	85319351
0/100	85320201	85320211	85320221		85320301	85320311	85320331	85320351
0/160	85321201	85321211	85321221		85321301	85321311	85321331	85321351
0/250	85322201	85322211	85322221		85322301	85322311	85322331	85322351
0/400	85323201	85323211	85323221		85323301	85323311	85323331	85323351
Price €								
0/600	85324201	85324211	85324221		85324301	85324311	85324331	85324351
0/1000	85325201	---	---		85325301	---	---	---

Refer to page 308 for additional costs.

Bourdon tube pressure gauges for industrial applications EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

For high accuracy measurement in arduous conditions.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

100 - 160

Accuracy class (EN 837-1/6)

1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area

Static load:

≤ 600 bar = full scale value
> 600 bar = $\frac{3}{4}$ x full scale value

Dynamic load:

≤ 600 bar = 0.9 x full scale value
> 600 bar = $\frac{2}{3}$ x full scale value

Short term:

≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\%$ /10K

falling temp. approx. $\pm 0.4\%$ /10K
percentage of full scale value

Protection

IP 54 (EN 60 529)

Standard version

Connection

Brass, bottom or bottom back

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Measuring element

Bourdon tube element,

≤ 60 bar „C“ type bourdon tube, copper alloy

> 60 bar helical tube, stainless steel 1.4571

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301
with blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

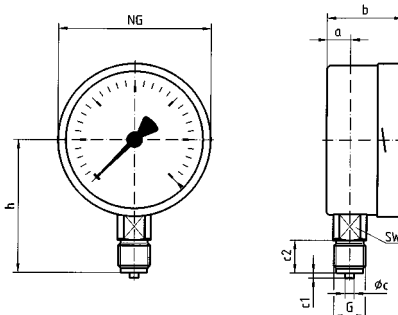
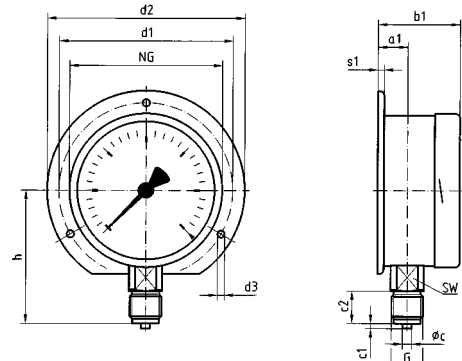
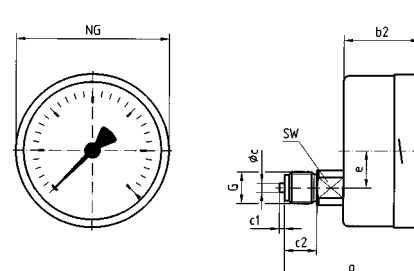
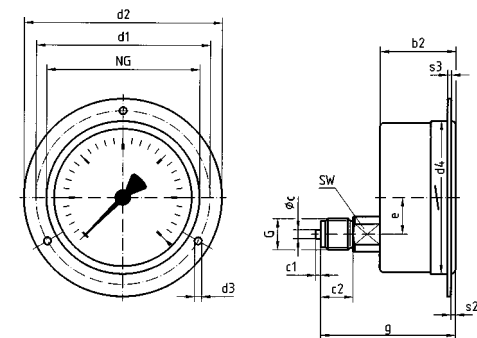
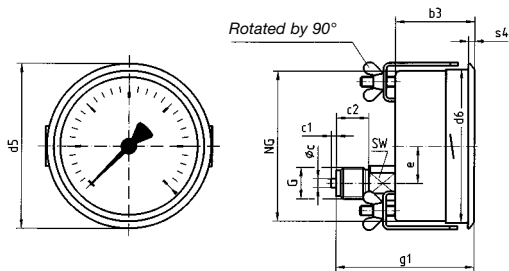
Instrument glass

Options

- Nominal size 250 (bottom connection)
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Safety front glass
- Damping screw
- Reference pointer
- Electrical contacts

Bourdon tube pressure gauges for industrial applications Type D 4 - NG 100/160

Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom connection, back flange</i> 
<i>Bottom back connection</i> 	<i>Bottom back connection, 3-hole fixing, panel mounting bezel</i> 
<i>Bottom back connection, panel mounting bezel for clamp fixing</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	26.5	G ¹ / ₂ B	81	81	86	5.5
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	26.5	G ¹ / ₂ B	82	84	116	6
250	16	-	57	59	-	-	6	3	20	270	285	5.8	-	-	-	-	G ¹ / ₂ B	-	-	165	2
Nominal size (NG)	s2	s3	s4	SW																	
100	4	2	4	22																	
160	4	2	4.5	22																	
250	-	-	-	22																	

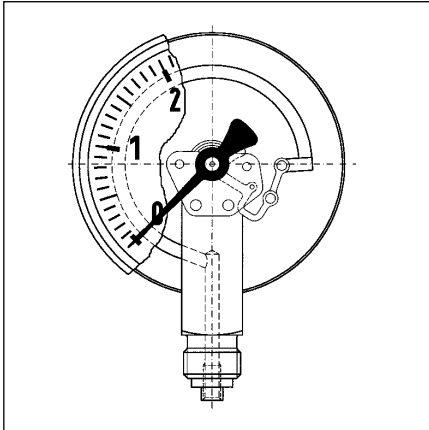
* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges for industrial applications EN 837-1

DG: M

Type	RF100 I,D401	RF100 I,D411	RF100 I,D431	RF100 I,D451	RF160 I,D401	RF160 I,D411	RF160 I,D431	RF160 I,D451
Version								
Housing-Ø	100	100	100	100	160	160	160	160
Housing	Stainless steel 1.4301 with bayonet type bezel, Instrument grade front glass							
Meas. elem.	Bourdon tube, copper alloy (> 60 bar stainless steel 1.4571)							
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B
			3-hole fixing, panel mounting bezel 1.4301 polished	Panel mounting bezel 1.4301, clamp fixing			3-hole fixing, panel mounting bezel 1.4301 polished	Panel mounting bezel 1.4301, clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85301401	85301411	85301431	85301451	85351401	85351411	85351431	85351451
-1/+0,6	85302401	85302411	85302431	85302451	85352401	85352411	85352431	85352451
-1/+1,5	85303401	85303411	85303431	85303451	85353401	85353411	85353431	85353451
-1/+3	85304401	85304411	85304431	85304451	85354401	85354411	85354431	85354451
-1/+5	85305401	85305411	85305431	85305451	85355401	85355411	85355431	85355451
-1/+9	85306401	85306411	85306431	85306451	85356401	85356411	85356431	85356451
-1/+15	85307401	85307411	85307431	85307451	85357401	85357411	85357431	85357451
Price €								
0/0,6	85309401	85309411	85309431	85309451	85359401	85359411	85359431	85359451
0/1	85310401	85310411	85310431	85310451	85360401	85360411	85360431	85360451
0/1,6	85311401	85311411	85311431	85311451	85361401	85361411	85361431	85361451
0/2,5	85312401	85312411	85312431	85312451	85362401	85362411	85362431	85362451
0/4	85313401	85313411	85313431	85313451	85363401	85363411	85363431	85363451
0/6	85314401	85314411	85314431	85314451	85364401	85364411	85364431	85364451
0/10	85315401	85315411	85315431	85315451	85365401	85365411	85365431	85365451
0/16	85316401	85316411	85316431	85316451	85366401	85366411	85366431	85366451
0/25	85317401	85317411	85317431	85317451	85367401	85367411	85367431	85367451
0/40	85318401	85318411	85318431	85318451	85368401	85368411	85368431	85368451
Price €								
0/60	85319401	85319411	85319431	85319451	85369401	85369411	85369431	85369451
0/100	85320401	85320411	85320431	85320451	85370401	85370411	85370431	85370451
0/160	85321401	85321411	85321431	85321451	85371401	85371411	85371431	85371451
0/250	85322401	85322411	85322431	85322451	85372401	85372411	85372431	85372451
0/400	85323401	85323411	85323431	85323451	85373401	85373411	85373431	85373451
Price €								
0/600	85324401	85324411	85324431	85324451	85374401	85374411	85374431	85374451
0/1000	85325401	85325411	85325431	85325451	85375401	85375411	85375431	85375451
Add. costs					Price €			
Nominal size 250	---	---	---	---		---	---	---

Glycerine filled Bourdon tube pressure gauges EN 837-1



Glycerine filled pressure gauges offer the following advantages:

- Can be used in applications where heavy vibrations and high, dynamic pressure loads occur.
- Long service life due to less wear and corrosion protection of the measuring system.
- No steaming up of the front glass in outdoor applications.



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

For measurements in areas with high vibration levels and high, dynamic pressure loads.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 6

Nominal size

40

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

0/4 bar to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Additional error when the temperature of the measuring element deviates from $+20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$
 percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent ($< 25\text{ bar}$)

IP 54

Standard version

Connection

Brass, centre back

$G\frac{1}{8}B$ – spanner size 12

(EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Plastic, white

Dial marking black

Pointer

Plastic, black

Housing

Plastic (ABS), black, with pressure relief port

Front glass

Plastic, ultrasonically welded to housing

Filling liquid

Glycerine (99.5 %)

Options

- Special scales
- Damping screw

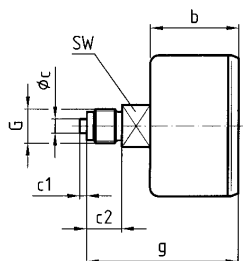
Housing types and dimensions

Type D 6 - NG 40

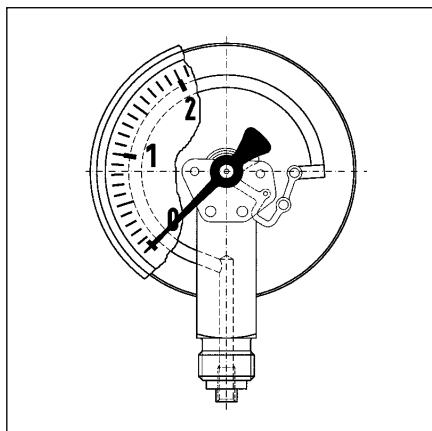
Housing types and dimensions



A diagram of a circular pressure gauge. The outer diameter is labeled 'D'. The gauge face has a scale with major markings every 10 units and minor markings every 2 units. The needle points to the 8th minor marking after the 0, which is 16 units. There are two small circles at the bottom of the gauge face.

[illegible]

Glycerine filled Bourdon tube pressure gauges EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

For measurements in areas with high vibration level and high, dynamic pressure loads.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 6

Nominal size

50 - 63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
 0/0.6 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent (< 25 bar)

IP 54

Standard version

Connection

Brass, bottom or centre back

G $\frac{1}{4}$ B - spanner size 14

(EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

> 60 bar helical tube

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Plastic, black

Housing

Polyamide, black

with pressure relief port

Crimped bezel

Aluminium, black

Front glass

Plastic

Filling liquid

Glycerine (99.5 %)

Options

- Back flange (NG 63)
- Clamp fixing
- 3-hole fixing panel mounting bezel (NG 63)
- Damping screw

Glycerine filled Bourdon tube pressure gauges

Type D 6 - NG 50/63

Housing types and dimensions

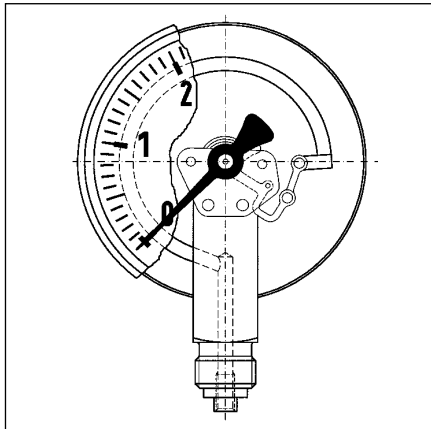
<i>Bottom connection</i>	<i>Bottom connection, back flange</i>
<i>Centre back connection</i>	<i>Centre back connection, 3-hole fixing, panel mounting bezel</i>
<i>Centre back connection, clamp fixing</i>	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2	d3*	D	G	g	h	m	n	s	s1	s2	SW	
50	12	-	31.5	-	5	2	13	-	-	-	53	G1/4B	54.5	47	82	73	5	-	-	14	
63	10	13	32	35	5	2	13	75	85	3.6	68	G1/4B	55	53	94	82	7	5.5	3	14	

* Dimensions according to DIN EN 837-1

Glycerine filled Bourdon tube pressure gauges EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

For measurement in areas with high levels of vibration and high, dynamic pressure loads.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 7

Nominal size

50 - 63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
0/0.6 to 0/400 bar
NG 63 to 0/600 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent ($\leq 25\text{ bar}$)

IP 54

Standard version

Connection

Brass, bottom or centre back

G $\frac{1}{4}$ B - spanner size 14

(EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301
with pressure relief port

Crimped bezel

Stainless steel 1.4301

Front glass

Plastic

Filling liquid

Glycerine (99.5 %)

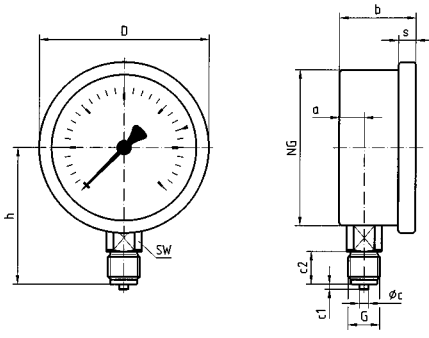
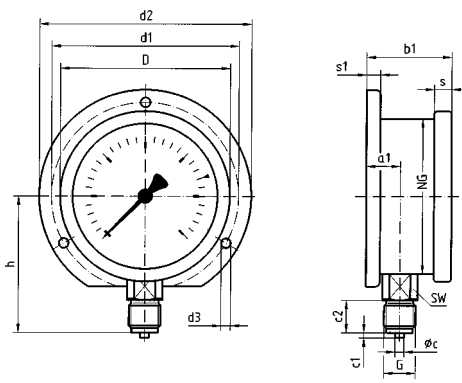
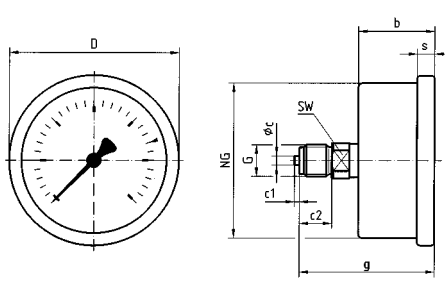
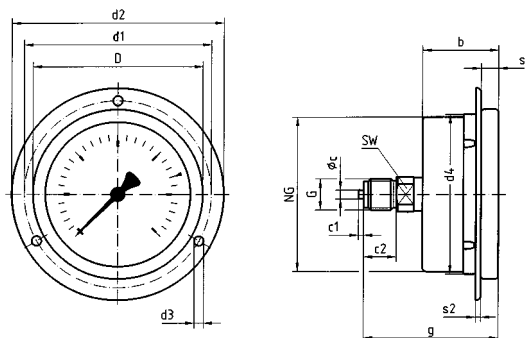
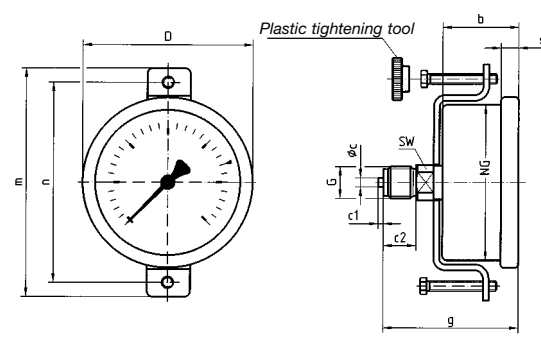
Options

- Filling liquid silicone oil
- Back flange (NG 63)
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 63)
- Crimped bezel, polished
- Special scales
- Damping screw

Glycerine filled Bourdon tube pressure gauges

Type D 7 - NG 50/63

Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom connection, back flange</i> 
<i>Centre back connection</i> 	<i>Centre back connection, 3-hole fixing, panel mounting bezel</i> 
<i>Centre back connection, clamp fixing</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2	d3*	d4	D	G	g	h	m	n	s	s1	s2	SW
50	11	-	28	-	5	2	13	-	-	-	-	53	G ¹ / ₄ B	51	45.5	82	73	4.5	-	-	14
63	9.5	13	30.5	34	5	2	13	75	85	3.6	64	68	G ¹ / ₄ B	53.3	53	94	82	7	5.5	2	14

* Dimensions according to DIN EN 837-1

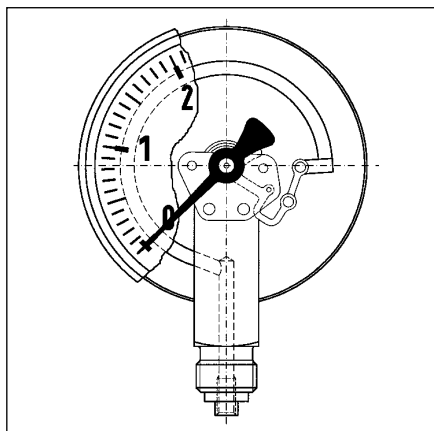
Glycerine filled Bourdon tube pressure gauges *EN 837-1*

DG: M

Type	RF50Gly,D701	RF50Gly,D711	RF50Gly,D751		RF63Gly,D701	RF63Gly,D711	RF63Gly,D731	RF63Gly,D751
Version								
Housing-Ø	50	50	50		63	63	63	63
Housing	Stainless steel 1.4301 with crimped bezel 1.4301, plastic front glass							
Meas. elem.	Bourdon tube element, copper alloy							
Accuracy class	1.6	1.6	1.6		1.6	1.6	1.6	1.6
Connection	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B		G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B
			Clamp fixing		* Dual scale, bar outer, black, psi inner, red			
							3-hole fixing, panel mounting bezel 1.4301	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.		Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85051701	85051711	85051751		85101701	85101711	85101731	85101751
-1/+0,6	85052701	85052711	85052751		85102701	85102711	85102731	85102751
-1/+1,5	85053701	85053711	85053751		85103701	85103711	85103731	85103751
-1/+3	85054701	85054711	85054751		85104701	85104711	85104731	85104751
-1/+5	85055701	85055711	85055751		85105701	85105711	85105731	85105751
-1/+9	85056701	85056711	85056751		85106701	85106711	85106731	85106751
-1/+15	85057701	85057711	85057751		85107701	85107711	85107731	85107751
Price €								
0/0,6	85059701	85059711	85059751		85109701	85109711	85109731	85109751
0/1	85060701	85060711	85060751		85110701	85110711	85110731	85110751
0/1,6	85061701	85061711	85061751		85111701	85111711	85111731	85111751
0/2,5	85062701	85062711	85062751		85112701	85112711	85112731	85112751
0/4	85063701	85063711	85063751		85113701	85113711	85113731	85113751
0/6	85064701	85064711	85064751		85114701	85114711	85114731	85114751
0/10	85065701	85065711	85065751		85115701	85115711	85115731	85115751
0/16	85066701	85066711	85066751		85116701	85116711	85116731	85116751
0/25	85067701	85067711	85067751		85117701	85117711	85117731	85117751
0/40	85068701	85068711	85068751		85118701	85118711	85118731	85118751
Price €								
0/60	85069701	85069711	85069751		85119701	85119711	85119731	85119751
0/100	85070701	85070711	85070751		85120701	85120711	85120731	85120751
0/160	85071701	85071711	85071751		85121701	85121711	85121731	85121751
0/250	85072701	85072711	85072751		85122701	85122711	85122731	85122751
0/400	85073701	85073711	85073751		85123701	85123711	85123731	85123751
Price €								
0/600	---	---	---		85124701	85124711	85124731	---

* For single scales add the key code „E“ to Part No.
Minimum order quantity for non-stock items = 10 pieces

Glycerine filled Bourdon tube pressure gauges EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

For measurement in areas with high levels of vibration and high, dynamic pressure loads.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 7

Nominal size

80 - 100

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
0/1 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K
percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent ($\leq 25\text{ bar}$)

IP 54

Standard version

Connection

Brass, bottom

NG 80-100 $G\frac{1}{2}B$ - spanner size 22

Brass, centre back

NG 80 $G\frac{1}{4}B$ - spanner size 14

NG 100 $G\frac{1}{2}B$ - spanner size 22
(EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with pressure relief port

Crimped bezel

Stainless steel 1.4301

Front glass

Plastic (Makrolon)

Filling liquid

Glycerine (99.5 %)

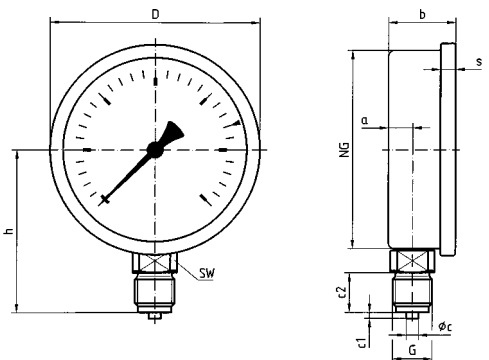
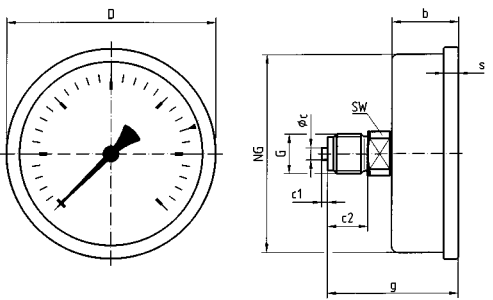
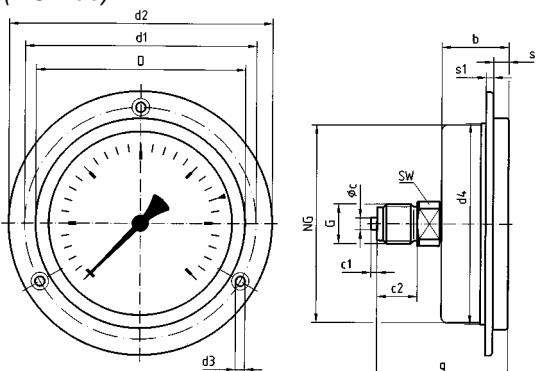
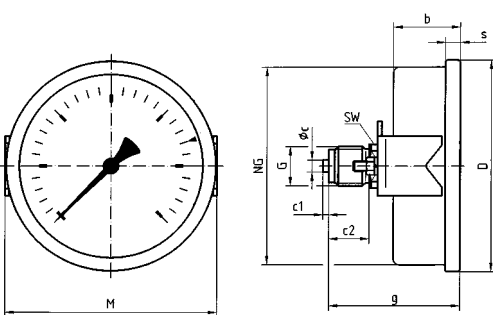
Options

- Filling liquid silicone oil
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 100)
- Crimped bezel, polished
- Stainless steel measuring system (up to 1,000 bar)
- Special scales
- Damping screw

Glycerine filled Bourdon tube pressure gauges

Type D 7 - NG 80/100

Housing types and dimensions

<i>Bottom connection</i> 	<i>Centre back connection</i> 
<i>Centre back connection, 3-hole fixing, panel mounting bezel (NG 100)</i> 	<i>Centre back connection, clamp fixing</i> 

Dimensions (mm)

Nominal size (NG)	a	b	Øc	c1	c2	d1	d2	d3	d4	D	g	G	h	M	s	s1	SW
80 Ms back	-	33.5	5	2	13	-	-	-	-	85	56.5	G1/4B	-	82	7	-	14
80 VA back	-	33.5	5	2	13	-	-	-	-	85	59	G1/4B	-	82	7	-	14
80 Ms bottom	12.2	33.5	6	3	20	-	-	-	-	85	-	G1/2B	71	-	7	-	22
80 VA bottom	12.2	33.5	6	3	20	-	-	-	-	85	-	G1/2B	79.5	-	7	-	22
100 Ms	12.2	33.5	6	3	20	116	132	4.8	101	106	65.5	G1/2B	81	106	7	3.8	22
100 VA	11.8	33.5	6	3	20	116	132	4.8	101	106	76.5	G1/2B	90	106	7	3.8	22

Glycerine filled Bourdon tube pressure gauges **EN 837-1**

DG: M

Measuring system brass

Measuring system stainless steel

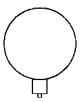
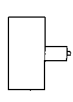
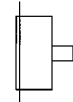
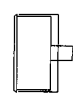
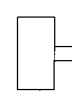
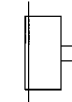
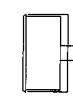
Type	RF80Gly,D701	RF80Gly,D711	RF80Gly,D751		RF80EGly,D702	RF80EGly,D712	RF80EGly,D752	
Version								
Housing-Ø	80	80	80		80	80	80	
Housing	Stainless steel 1.4301 with crimped bezel 1.4301, plastic front glass							
Meas. elem.	Bourdon tube, brass				Bourdon tube, stainless steel 1.4571			
Accuracy class	1.6	1.6	1.6		1.6	1.6	1.6	
Connection	G ¹ / ₂ B	G ¹ / ₄ B	G ¹ / ₄ B		G ¹ / ₂ B	G ¹ / ₄ B	G ¹ / ₄ B	
			Clamp fixing				Clamp fixing	
Range (bar)	Part no.	Part no.	Part no.		Part no.	Part no.	Part no.	
Price €								
-1/0	85151701	85151711	85151751		85151702	85151712	85151752	
-1/+0,6	85152701	85152711	85152751		85152702	85152712	85152752	
-1/+1,5	85153701	85153711	85153751		85153702	85153712	85153752	
-1/+3	85154701	85154711	85154751		85154702	85154712	85154752	
-1/+5	85155701	85155711	85155751		85155702	85155712	85155752	
-1/+9	85156701	85156711	85156751		85156702	85156712	85156752	
-1/+15	85157701	85157711	85157751		85157702	85157712	85157752	
Price €								
0/1	85160701	85160711	85160751		85160702	85160712	85160752	
0/1,6	85161701	85161711	85161751		85161702	85161712	85161752	
0/2,5	85162701	85162711	85162751		85162702	85162712	85162752	
0/4	85163701	85163711	85163751		85163702	85163712	85163752	
0/6	85164701	85164711	85164751		85164702	85164712	85164752	
0/10	85165701	85165711	85165751		85165702	85165712	85165752	
0/16	85166701	85166711	85166751		85166702	85166712	85166752	
0/25	85167701	85167711	85167751		85167702	85167712	85167752	
0/40	85168701	85168711	85168751		85168702	85168712	85168752	
Price €								
0/60	85169701	85169711	85169751		85169702	85169712	85169752	
0/100	85170701	85170711	85170751		85170702	85170712	85170752	
0/160	85171701	85171711	85171751		85171702	85171712	85171752	
0/250	85172701	85172711	85172751		85172702	85172712	85172752	
0/400	85173701	85173711	85173751		85173702	85173712	85173752	
Price €								
0/600	---	---	---		85174702	85174712	85174752	
0/1000	---	---	---		85175702	85175712	85175752	
Add. costs					Price €	Price €	Price €	
class 1.0	---	---	---					

Glycerine filled Bourdon tube pressure gauges EN 837-1

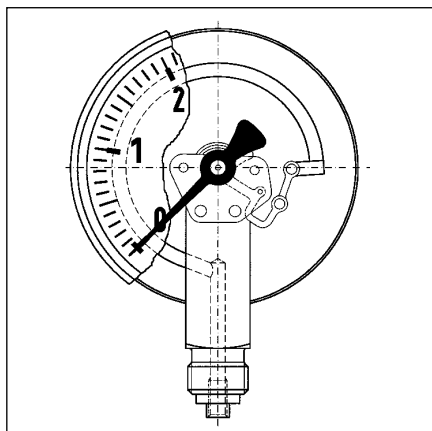
DG: M

Measuring system brass

Measuring system stainless steel

Type	RF100Gly,D701	RF100Gly,D711	RF100Gly,D731	RF100Gly,D751	RF100EGly,D702	RF100EGly,D712	RF100EGly,D732	RF100EGly,D752
Version								
Housing-Ø	100	100	100	100	100	100	100	100
Housing	Stainless steel 1.4301 with crimped bezel 1.4301, plastic front glass							
Meas. elem.	Bourdon tube, brass				Bourdon tube, stainless steel 1.4571			
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B
			3-hole fixing, panel mounting bezel, 1.4301	Clamp fixing			3-hole fixing, panel mounting bezel, 1.4301	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85201701	85201711	85201731	85201751	85201702	85201712	85201732	85201752
-1/+0,6	85202701	85202711	85202731	85202751	85202702	85202712	85202732	85202752
-1/+1,5	85203701	85203711	85203731	85203751	85203702	85203712	85203732	85203752
-1/+3	85204701	85204711	85204731	85204751	85204702	85204712	85204732	85204752
-1/+5	85205701	85205711	85205731	85205751	85205702	85205712	85205732	85205752
-1/+9	85206701	85206711	85206731	85206751	85206702	85206712	85206732	85206752
-1/+15	85207701	85207711	85207731	85207751	85207702	85207712	85207732	85207752
Price €								
0/1	85210701	85210711	85210731	85210751	85210702	85210712	85210732	85210752
0/1,6	85211701	85211711	85211731	85211751	85211702	85211712	85211732	85211752
0/2,5	85212701	85212711	85212731	85212751	85212702	85212712	85212732	85212752
0/4	85213701	85213711	85213731	85213751	85213702	85213712	85213732	85213752
0/6	85214701	85214711	85214731	85214751	85214702	85214712	85214732	85214752
0/10	85215701	85215711	85215731	85215751	85215702	85215712	85215732	85215752
0/16	85216701	85216711	85216731	85216751	85216702	85216712	85216732	85216752
0/25	85217701	85217711	85217731	85217751	85217702	85217712	85217732	85217752
0/40	85218701	85218711	85218731	85218751	85218702	85218712	85218732	85218752
Price €								
0/60	85219701	85219711	85219731	85219751	85219702	85219712	85219732	85219752
0/100	85220701	85220711	85220731	85220751	85220702	85220712	85220732	85220752
0/160	85221701	85221711	85221731	85221751	85221702	85221712	85221732	85221752
0/250	85222701	85222711	85222731	85222751	85222702	85222712	85222732	85222752
0/400	85223701	85223711	85223731	85223751	85223702	85223712	85223732	85223752
Price €								
0/600	---	---	---	---	85224702	85224712	85224732	85224752
0/1000	---	---	---	---	85225702	85225712	85225732	85225752
Add. costs					Price €	Price €	Price €	Price €
class 1.0	---	---	---	---				

Glycerine filled Bourdon tube pressure gauges EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

For measurements in areas with high levels of vibration and high, dynamic pressure loads.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 8

Nominal size

100 - 160

Accuracy class (EN 837-1/6)

1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/1,000 bar

Application area

Static load:

≤ 600 bar = full scale value

> 600 bar = $\frac{3}{4}$ x full scale value

Dynamic load:

≤ 600 bar = 0.9 x full scale value

> 600 bar = $\frac{2}{3}$ x full scale value

Short-term:

≤ 600 bar = 1.3 x full scale value

> 600 bar = full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\%$ /10K

falling temp. approx. $\pm 0.4\%$ /10K

percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent (≤ 25 bar)

IP 54

Standard version

Connection

Brass, bottom or bottom back:

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Measuring element

Bourdon tube element,

≤ 60 bar „C“ type bourdon tube,

copper alloy

> 60 bar helical tube, stainless steel

1.4571

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

Instrument glass

Filling liquid

Glycerine (99.5 %)

Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Special scales

Glycerine filled Bourdon tube pressure gauges

Type D 8 - NG 100/160

Housing types and dimensions

<i>Bottom connection</i>	<i>Bottom connection, back flange</i>
<i>Bottom back connection</i>	<i>Bottom back connection, 3-hole fixing, panel mounting bezel</i>
<i>Bottom back connection, panel mounting bezel for clamp fixing</i>	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	26.5	G ¹ / ₂ B	81	81	86	5.5
160	17.5	20	50	53	50	52	6	3	20	178	196	5.8	164	167	161	26.5	G ¹ / ₂ B	82	84	116	6
Nominal size (NG)	s2	s3	s4	SW																	
100	4	2	4	22																	
160	4	2	4.5	22																	

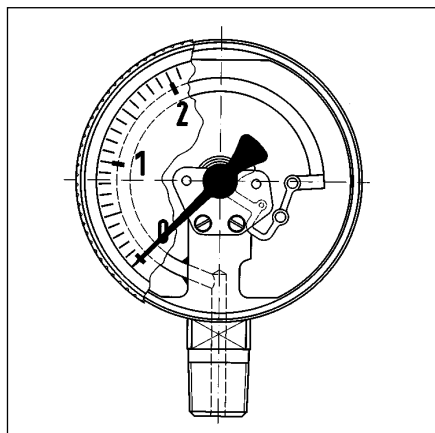
* Dimensions according to DIN EN 837-1

Glycerine filled Bourdon tube pressure gauges EN 837-1

DG: M

Type	RF100Gly,D801	RF100Gly,D811	RF100Gly,D831	RF100Gly,D851	RF160Gly,D801	RF160Gly,D811	RF160Gly,D831	RF160Gly,D851
Version								
Housing-Ø	100	100	100	100	160	160	160	160
Housing	Stainless steel 1.4301, Instrument grade front glass							
Meas. elem.	Bourdon tube, copper alloy (> 60 bar stainless steel 1.4571)							
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B
			3-hole fixing, panel mounting bezel, 1.4301 polished	Panel mounting bezel, 1.4301, clamp fixing			3-hole fixing, panel mounting bezel, 1.4301 polished	Panel mounting bezel, 1.4301 clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85201801	85201811	85201831	85201851	85251801	85251811	85251831	85251851
-1/+0,6	85202801	85202811	85202831	85202851	85252801	85252811	85252831	85252851
-1/+1,5	85203801	85203811	85203831	85203851	85253801	85253811	85253831	85253851
-1/+3	85204801	85204811	85204831	85204851	85254801	85254811	85254831	85254851
-1/+5	85205801	85205811	85205831	85205851	85255801	85255811	85255831	85255851
-1/+9	85206801	85206811	85206831	85206851	85256801	85256811	85256831	85256851
-1/+15	85207801	85207811	85207831	85207851	85257801	85257811	85257831	85257851
Price €								
0/0,6	85209801	85209811	85209831	85209851	85259801	85259811	85259831	85259851
0/1	85210801	85210811	85210831	85210851	85260801	85260811	85260831	85260851
0/1,6	85211801	85211811	85211831	85211851	85261801	85261811	85261831	85261851
0/2,5	85212801	85212811	85212831	85212851	85262801	85262811	85262831	85262851
0/4	85213801	85213811	85213831	85213851	85263801	85263811	85263831	85263851
0/6	85214801	85214811	85214831	85214851	85264801	85264811	85264831	85264851
0/10	85215801	85215811	85215831	85215851	85265801	85265811	85265831	85265851
0/16	85216801	85216811	85216831	85216851	85266801	85266811	85266831	85266851
0/25	85217801	85217811	85217831	85217851	85267801	85267811	85267831	85267851
0/40	85218801	85218811	85218831	85218851	85268801	85268811	85268831	85268851
Price €								
0/60	85219801	85219811	85219831	85219851	85269801	85269811	85269831	85269851
0/100	85220801	85220811	85220831	85220851	85270801	85270811	85270831	85270851
0/160	85221801	85221811	85221831	85221851	85271801	85271811	85271831	85271851
0/250	85222801	85222811	85222831	85222851	85272801	85272811	85272831	85272851
0/400	85223801	85223811	85223831	85223851	85273801	85273811	85273831	85273851
Price €								
0/600	85224801	85224811	85224831	85224851	85274801	85274811	85274831	85274851
0/1000	85225801	85225811	85225831	85225851	85275801	85275811	85275831	85275851

Glycerine filled Bourdon tube pressure gauges with hot pressed brass housing EN 837-1



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys.

For measurements in areas subject to extreme levels of vibration.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 0

Nominal size

63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/600 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\%$ /10K

falling temp. approx. $\pm 0.4\%$ /10K

percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent ($\leq 25\text{ bar}$)

IP 54

Standard version

Connection

Brass, bottom or centre back

$\frac{1}{4}$ -18 NPT (EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Hot pressed brass 2.0401, lacquered with brass colour, with pressure relief port

Screw type bezel

Brass, bare metal surface, lacquered with transparent lacquer

Front glass

Laminated safety front glass

Filling liquid

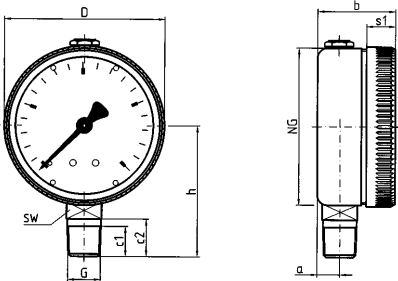
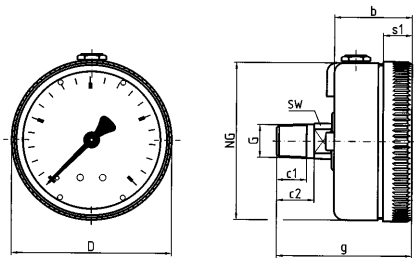
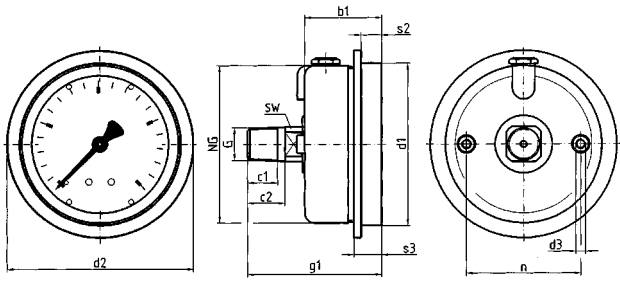
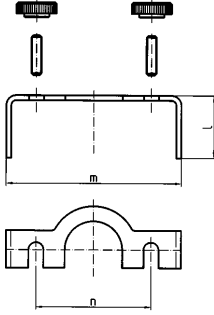
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Bezel chrome plated, clamp fixing
- Special scales
- Damping screw

Glycerine filled Bourdon tube pressure gauges with hot pressed brass housing Type D 0 - NG 63

Housing types and dimensions

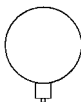
<i>Bottom connection</i> 	<i>Centre back connection</i> 
<i>Centre back connection, for clamp fixing</i> 	<i>Clamp fixing</i> 

Dimensions (mm)

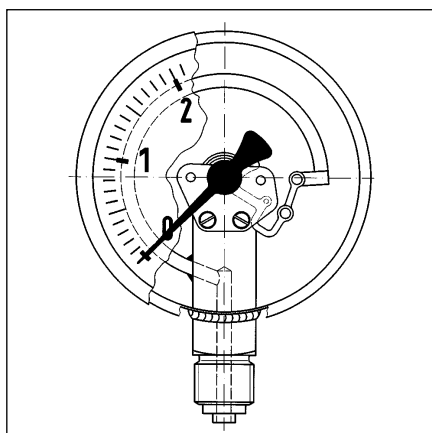
Nominal size (NG)	a	b	b1	c1	c2	D	d1	d2	d3	G	g	g1	h	l	m	n	s1	s2	s3
63	9	31	31	12	15	64	65	75	M4	1/4-18 NPT	54	54	52.5	25	70	46	11.5	8.2	11.2
Nominal size (NG)	SW																		
63	14																		

Glycerine filled Bourdon tube pressure gauges with hot pressed brass housing EN 837-1

DG: M

Type	RF63Gly,D001	RF63Gly,D011	RF63Gly,D051
Version			
Housing-Ø	63	63	63
Housing	Hot pressed brass 2.0401, lacquered with brass-coloured lacquer, laminated safety front glass		
Meas. elem.	Bourdon tube element, copper alloy		
Accuracy class	1.6	1.6	1.6
Connection	1/4-18NPT	1/4-18NPT	1/4-18NPT
			Bezel chrome plated and clamp fixing
Range (bar)	Part no.	Part no.	Part no.
Price €			
-1/0	85101001	85101011	85101051
-1/+0,6	85102001	85102011	85102051
-1/+1,5	85103001	85103011	85103051
-1/+3	85104001	85104011	85104051
-1/+5	85105001	85105011	85105051
-1/+9	85106001	85106011	85106051
-1/+15	85107001	85107011	85107051
Price €			
0/0,6	85109001	85109011	85109051
0/1	85110001	85110011	85110051
0/1,6	85111001	85111011	85111051
0/2,5	85112001	85112011	85112051
0/4	85113001	85113011	85113051
0/6	85114001	85114011	85114051
0/10	85115001	85115011	85115051
0/16	85116001	85116011	85116051
0/25	85117001	85117011	85117051
0/40	85118001	85118011	85118051
Price €			
0/60	85119001	85119011	85119051
0/100	85120001	85120011	85120051
0/160	85121001	85121011	85121051
0/250	85122001	85122011	85122051
0/400	85123001	85123011	85123051
Price €			
0/600	85124001	85124011	85124051

Bourdon tube pressure gauges for chemical applications EN 837-1



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. Suitable for use in corrosive atmospheres.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 9

Nominal size

50 - 63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

NG 50:

-1/0 to -1/+15 bar

0/0.6 to 0/600 bar

NG 63:

-1/0 to -1/+15 bar

0/0.6 to 0/1,000 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +150\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent ($\leq 25\text{ bar}$)

IP 54

Standard version

Connection

Stainless steel 1.4571

NG 50 bottom or bottom back

NG 63 bottom or centre back

G $\frac{1}{4}$ B - spanner size 14

(EN 837-1/7.3)

Measuring element

Bourdon tube, stainless steel 1.4571

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

leak tested (EN 837-1/9.5.6)

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with pressure relief port

Crimped bezel

Stainless steel 1.4301

Front glass

NG 50 plastic

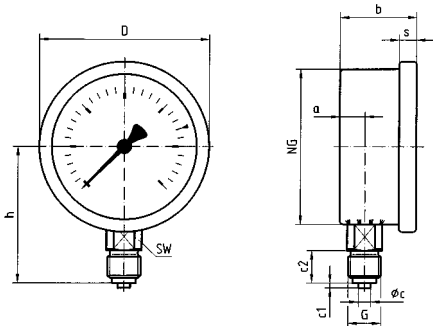
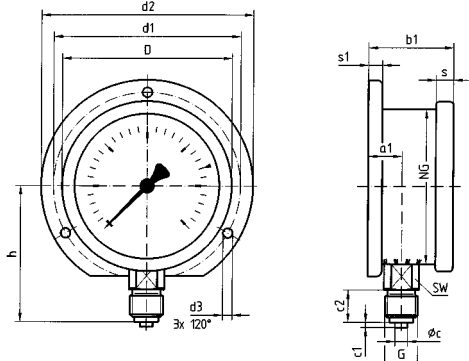
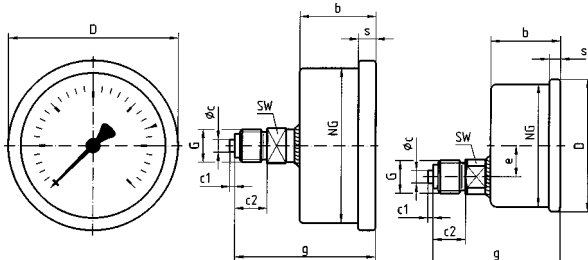
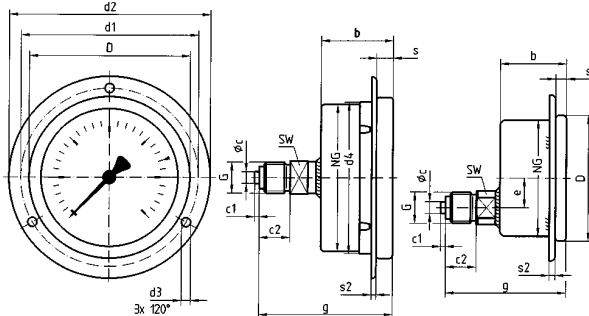
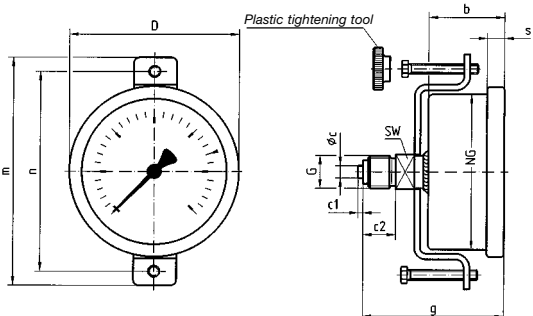
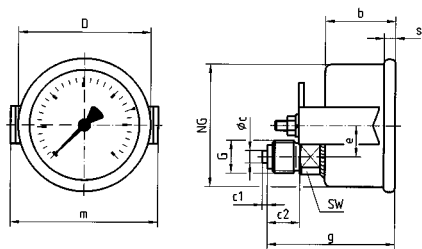
NG 63 laminated safety glass

Options

- Plastic front glass (NG 63)
- Brass movement
- Back flange (NG 63)
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 63)
- Crimped bezel, polished
- Special scales

Bourdon tube pressure gauges for chemical applications Type D 9 - NG 50/63

Housing types and dimensions

Bottom connection NG 50/63 	Bottom connection, back flange, NG 63 
Bottom back connection NG 63 NG 50 	Bottom back connection, 3-hole fixing, panel mounting bezel NG 63 NG 50 
Bottom back connection, clamp fixing, NG 63 	Bottom back connection, clamp fixing, NG 50 

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	d4	D	e	G	g	h	m	n	s	s1	s2
50	10.5	-	28	-	5	2	13	60	70	3.6	-	53	12.5	G1/4B	51	46	59	-	4.5	-	2.5
63	9.5	13	30.5	34	5	2	13	75	85	3.6	64	68	-	G1/4B	56	53	94	82	7	5.5	2
Nominal size (NG)	SW																				
50	14																				
63	14																				

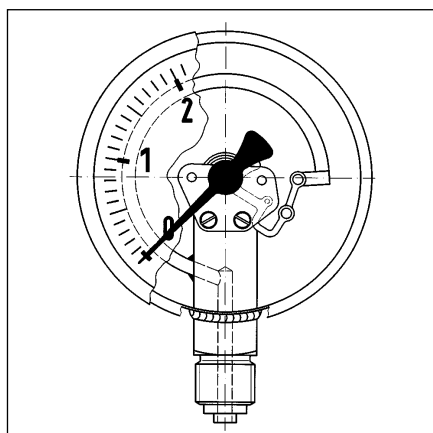
* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges for chemical applications EN 837-1

DG: M

Type	RF50Ch,D902	RF50Ch,D912	RF50Ch,D952		RF63Ch,D902	RF63Ch,D912	RF63Ch,D932	RF63Ch,D952
Version								
Housing-Ø	50	50	50		63	63	63	63
Housing	Stainless steel 1.4301 with crimped bezel 1.4301							
Meas. elem.	Bourdon tube, stainless steel 1.4571							
Accuracy class	1.6	1.6	1.6		1.6	1.6	1.6	1.6
Connection	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B		G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B
			Clamp fixing				3-hole fixing, panel mounting bezel 1.4301, bare metal surface	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.		Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85051902	85051912	85051952		85101902	85101912	85101932	85101952
-1/+0,6	85052902	85052912	85052952		85102902	85102912	85102932	85102952
-1/+1,5	85053902	85053912	85053952		85103902	85103912	85103932	85103952
-1/+3	85054902	85054912	85054952		85104902	85104912	85104932	85104952
-1/+5	85055902	85055912	85055952		85105902	85105912	85105932	85105952
-1/+9	85056902	85056912	85056952		85106902	85106912	85106932	85106952
-1/+15	85057902	85057912	85057952		85107902	85107912	85107932	85107952
Price €								
0/0,6	85059902	85059912	85059952		85109902	85109912	85109932	85109952
0/1	85060902	85060912	85060952		85110902	85110912	85110932	85110952
0/1,6	85061902	85061912	85061952		85111902	85111912	85111932	85111952
0/2,5	85062902	85062912	85062952		85112902	85112912	85112932	85112952
0/4	85063902	85063912	85063952		85113902	85113912	85113932	85113952
0/6	85064902	85064912	85064952		85114902	85114912	85114932	85114952
0/10	85065902	85065912	85065952		85115902	85115912	85115932	85115952
0/16	85066902	85066912	85066952		85116902	85116912	85116932	85116952
0/25	85067902	85067912	85067952		85117902	85117912	85117932	85117952
0/40	85068902	85068912	85068952		85118902	85118912	85118932	85118952
Price €								
0/60	85069902	85069912	85069952		85119902	85119912	85119932	85119952
0/100	85070902	85070912	85070952		85120902	85120912	85120932	85120952
0/160	85071902	85071912	85071952		85121902	85121912	85121932	85121952
0/250	85072902	85072912	85072952		85122902	85122912	85122932	85122952
0/400	85073902	85073912	85073952		85123902	85123912	85123932	85123952
Price €								
0/600	85074902	85074912	85074952		85124902	85124912	85124932	85124952
0/1000	---	---	---		85125902	85125912	85125932	85125952

Bourdon tube pressure gauges for chemical applications EN 837-1



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. Suitable for use in corrosive atmospheres.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

100 - 160

Accuracy class (EN 837-1/6)

1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

NG 100 0/0.6 to 0/1,000 bar

NG 160 0/0.6 to 0/1,600 bar

Application area

Static load:

≤ 600 bar = full scale value

> 600 bar = $\frac{3}{4}$ x full scale value

Dynamic load:

≤ 600 bar = 0.9 x full scale value

> 600 bar = $\frac{2}{3}$ x full scale value

Short term:

≤ 600 bar = 1.3 x full scale value

> 600 bar = full scale value

Operating temperature range

Medium: $T_{max} = +150\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent (≤ 25 bar)

IP 54

Standard version

Connection

Stainless steel 1.4571, bottom or bottom back

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Measuring element

Bourdon tube, stainless steel

1.4571

≤ 60 bar „C“ type bourdon tube

> 60 bar helical tube

leak tested (EN 837-1/9.5.6)

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

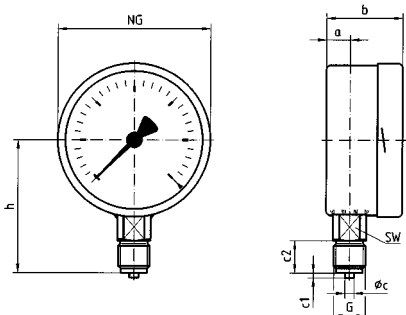
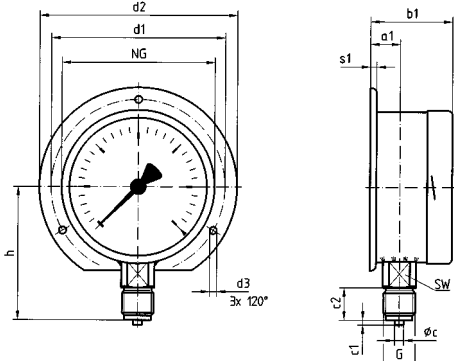
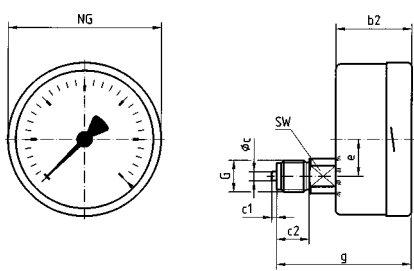
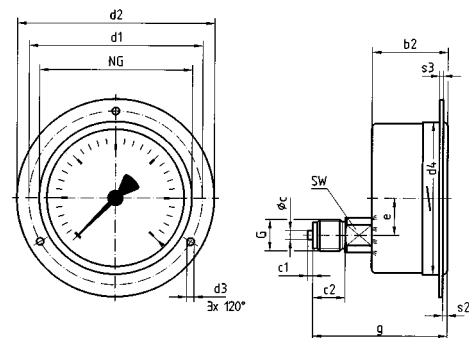
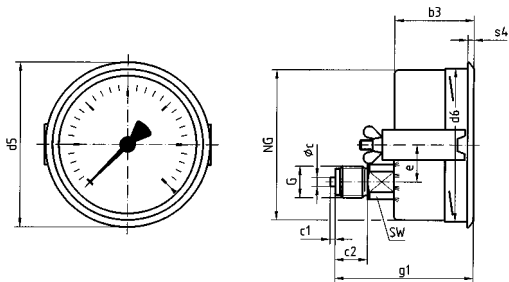
Options

- Brass movement
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Special scales
- Electrical contacts

Bourdon tube pressure gauges for chemical applications

Type D 4 - NG 100/160

Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom connection, back flange</i> 
<i>Bottom back connection</i> 	<i>Bottom back connection, 3-hole fixing, panel mounting bezel</i> 
<i>Bottom back connection, panel mounting bezel for clamp fixing</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2*	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	34.5	G ¹ / ₂ B	83	83	86	5.5
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	34.5	G ¹ / ₂ B	84	86	116	6
Nominal size (NG)	s2	s3	s4	SW																	
100	4	2	4	22																	
160	4	2	4.5	22																	

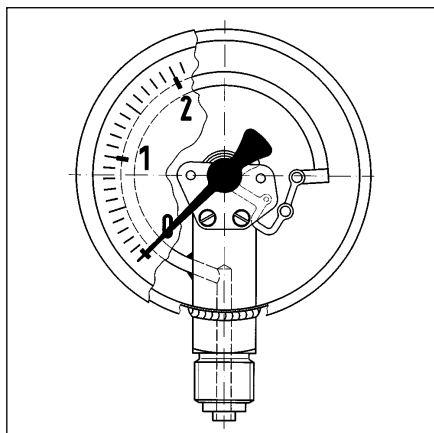
* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges for chemical applications EN 837-1

DG: M

Type	RF100Ch,D402	RF100Ch,D412	RF100Ch,D432	RF100Ch,D452	RF160Ch,D402	RF160Ch,D412	RF160Ch,D432	RF160Ch,D452
Version								
Housing-Ø	100	100	100	100	160	160	160	160
Housing	Stainless steel 1.4301 with bayonet type bezel, laminated safety front glass							
Meas. elem.	Bourdon tube, stainless steel 1.4571							
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B
			3-hole fixing, panel mounting bezel, 1.4301 polished	Panel mounting bezel, 1.4301 polished, clamp fixing			3-hole fixing, panel mounting bezel, 1.4301 polished	Panel mounting bezel, 1.4301 polished, clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85201402	85201412	85201432	85201452	85251402	85251412	85251432	85251452
-1/+0,6	85202402	85202412	85202432	85202452	85252402	85252412	85252432	85252452
-1/+1,5	85203402	85203412	85203432	85203452	85253402	85253412	85253432	85253452
-1/+3	85204402	85204412	85204432	85204452	85254402	85254412	85254432	85254452
-1/+5	85205402	85205412	85205432	85205452	85255402	85255412	85255432	85255452
-1/+9	85206402	85206412	85206432	85206452	85256402	85256412	85256432	85256452
-1/+15	85207402	85207412	85207432	85207452	85257402	85257412	85257432	85257452
Price €								
0/0,6	85209402	85209412	85209432	85209452	85259402	85259412	85259432	85259452
0/1	85210402	85210412	85210432	85210452	85260402	85260412	85260432	85260452
0/1,6	85211402	85211412	85211432	85211452	85261402	85261412	85261432	85261452
0/2,5	85212402	85212412	85212432	85212452	85262402	85262412	85262432	85262452
0/4	85213402	85213412	85213432	85213452	85263402	85263412	85263432	85263452
0/6	85214402	85214412	85214432	85214452	85264402	85264412	85264432	85264452
0/10	85215402	85215412	85215432	85215452	85265402	85265412	85265432	85265452
0/16	85216402	85216412	85216432	85216452	85266402	85266412	85266432	85266452
0/25	85217402	85217412	85217432	85217452	85267402	85267412	85267432	85267452
0/40	85218402	85218412	85218432	85218452	85268402	85268412	85268432	85268452
Price €								
0/60	85219402	85219412	85219432	85219452	85269402	85269412	85269432	85269452
0/100	85220402	85220412	85220432	85220452	85270402	85270412	85270432	85270452
0/160	85221402	85221412	85221432	85221452	85271402	85271412	85271432	85271452
0/250	85222402	85222412	85222432	85222452	85272402	85272412	85272432	85272452
0/400	85223402	85223412	85223432	85223452	85273402	85273412	85273432	85273452
Price €								
0/600	85224402	85224412	85224432	85224452	85274402	85274412	85274432	85274452
0/1000	85225402	85225412	85225432	85225452	85275402	85275412	85275432	85275452
0/1600	---	---	---	---	85276402	85276412	85276432	85276452

Bourdon tube pressure gauges with glycerine filling, for chemical applications EN 837-1



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. Suitable for use in corrosive atmospheres.

For measurement in areas subject to high vibration levels and high, dynamic pressure loads.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 7

Nominal size

50 - 63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

NG 50:

-1/0 to -1/+15 bar

0/0.6 to 0/600 bar

NG 63:

-1/0 to -1/+15 bar

0/0.6 to 0/1,000 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +150\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ }%$ /10K

falling temp. approx. $\pm 0.4\text{ }%$ /10K

percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent ($\leq 25\text{ bar}$)

IP 54

Standard version

Connection

Stainless steel 1.4571

NG 50 bottom or bottom back

NG 63 bottom or centre back

G $\frac{1}{4}$ B - spanner size 14

(EN 837-1/7.3)

Measuring element

Bourdon tube, stainless steel 1.4571

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

leak tested (EN 837-1/9.5.6)

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with pressure relief port

Crimped bezel

Stainless steel 1.4301

Front glass

NG 50 plastic

NG 63 laminated safety glass

Filling liquid

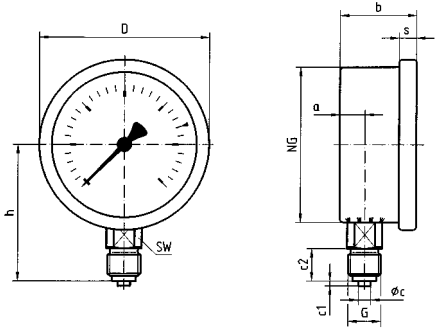
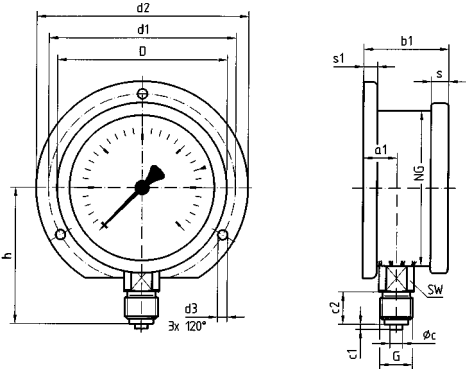
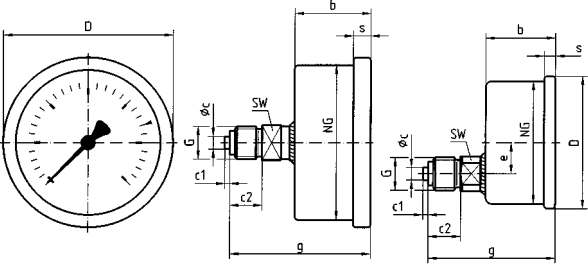
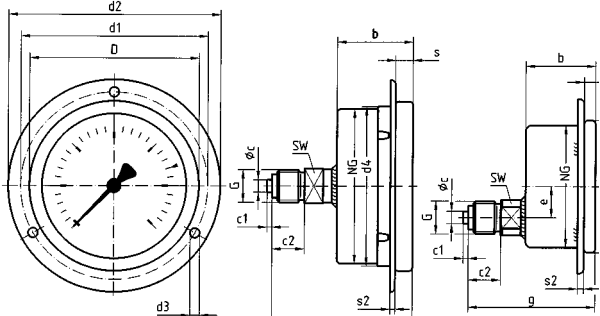
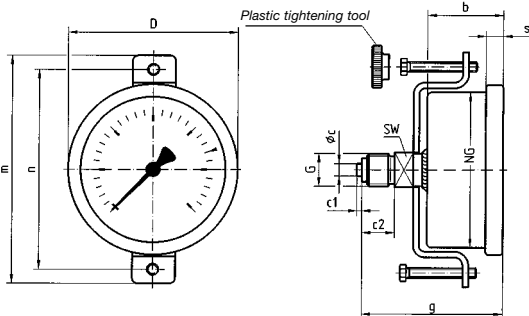
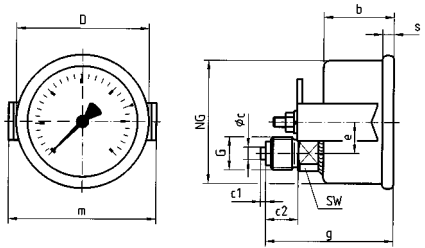
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Plastic front glass (NG 63)
- Brass movement
- Back flange (NG 63)
- Clamp fixing
- 3-hole fixing, panel mounting bezel, (NG 63)
- Crimped bezel, polished
- Special scales

Bourdon tube pressure gauges with glycerine filling, for chemical applications Type D 7 - NG 50/63

Housing types and dimensions

Bottom connection NG 50/63 	Bottom connection, back flange, NG 63 
Centre or bottom back connection NG 63 NG 50 	Centre or bottom back connection, 3-hole fixing, panel mounting bezel NG 63 NG 50 
Centre back connection, clamp fixing, NG 63 	Bottom back connection, clamp fixing, NG 50 

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	d4	D	e	G	g	h	m	n	s	s1	s2
50	10.5	-	28	-	5	2	13	60	70	3.6	-	53	12.5	G1/4B	51	46	59	-	4.5	-	2.5
63	9.5	13	30.5	34	5	2	13	75	85	3.6	64	68	-	G1/4B	56	53	94	82	7	5.5	2
Nominal size (NG)	SW																				
50	14																				
63	14																				

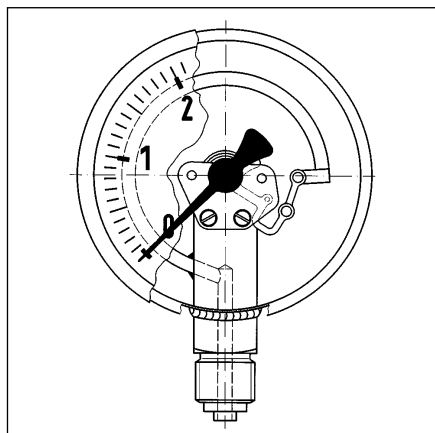
* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges with glycerine filling, for chemical applications EN 837-1

DG: M

Type	RF50ChGly,D702	RF50ChGly,D712	RF50ChGly,D752		RF63ChGly,D702	RF63ChGly,D712	RF63ChGly,D732	RF63ChGly,D752
Version								
Housing-Ø	50	50	50		63	63	63	63
Housing	Stainless steel 1.4301 with crimped bezel 1.4301							
Meas. elem.	Bourdon tube, stainless steel 1.4571							
Accuracy class	1.6	1.6	1.6		1.6	1.6	1.6	1.6
Connection	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B		G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B
			Clamp fixing				3-hole fixing, panel mounting bezel, 1.4301, bare metal surface	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.		Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85051702	85051712	85051752		85101702	85101712	85101732	85101752
-1/+0,6	85052702	85052712	85052752		85102702	85102712	85102732	85102752
-1/+1,5	85053702	85053712	85053752		85103702	85103712	85103732	85103752
-1/+3	85054702	85054712	85054752		85104702	85104712	85104732	85104752
-1/+5	85055702	85055712	85055752		85105702	85105712	85105732	85105752
-1/+9	85056702	85056712	85056752		85106702	85106712	85106732	85106752
-1/+15	85057702	85057712	85057752		85107702	85107712	85107732	85107752
Price €								
0/0,6	85059702	85059712	85059752		85109702	85109712	85109732	85109752
0/1	85060702	85060712	85060752		85110702	85110712	85110732	85110752
0/1,6	85061702	85061712	85061752		85111702	85111712	85111732	85111752
0/2,5	85062702	85062712	85062752		85112702	85112712	85112732	85112752
0/4	85063702	85063712	85063752		85113702	85113712	85113732	85113752
0/6	85064702	85064712	85064752		85114702	85114712	85114732	85114752
0/10	85065702	85065712	85065752		85115702	85115712	85115732	85115752
0/16	85066702	85066712	85066752		85116702	85116712	85116732	85116752
0/25	85067702	85067712	85067752		85117702	85117712	85117732	85117752
0/40	85068702	85068712	85068752		85118702	85118712	85118732	85118752
Price €								
0/60	85069702	85069712	85069752		85119702	85119712	85119732	85119752
0/100	85070702	85070712	85070752		85120702	85120712	85120732	85120752
0/160	85071702	85071712	85071752		85121702	85121712	85121732	85121752
0/250	85072702	85072712	85072752		85122702	85122712	85122732	85122752
0/400	85073702	85073712	85073752		85123702	85123712	85123732	85123752
Price €								
0/600	85074702	85074712	85074752		85124702	85124712	85124732	85124752
0/1000	---	---	---		85125702	85125712	85125732	85125752

Bourdon tube pressure gauges with glycerine filling, for chemical applications EN 837-1



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. Suitable for use in corrosive atmospheres.

For measurement in areas with high vibration levels and high, dynamic pressure loads.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 8

Nominal size

100 - 160

Accuracy class (EN 837-1/6)

1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

NG 100 0/0.6 to 0/1,000 bar

NG 160 0/0.6 to 0/1,600 bar

Application area

Static load:

≤ 600 bar = full scale value

> 600 bar = $\frac{3}{4}$ x full scale value

Dynamic load:

≤ 600 bar = 0.9 x full scale value

> 600 bar = $\frac{2}{3}$ x full scale value

Short term:

≤ 600 bar = 1.3 x full scale value

> 600 bar = full scale value

Operating temperature range

Medium: $T_{max} = +150\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 65 (EN 60529)

with housing vent (≤ 25 bar)

IP 54

Standard version

Connection

Stainless steel 1.4571, bottom or bottom back

G $\frac{1}{2}$ B- spanner size 22

(EN 837-1/7.3)

Measuring element

Bourdon tube, stainless steel

1.4571

≤ 60 bar „C“ type bourdon tube

> 60 bar helical tube

leak tested (EN 837-1/9.5.6)

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

Filling liquid

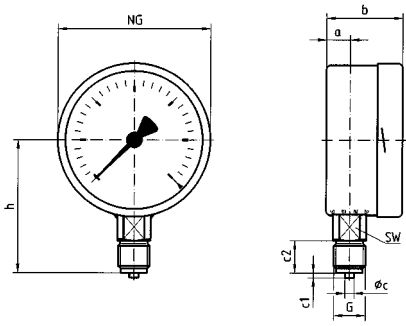
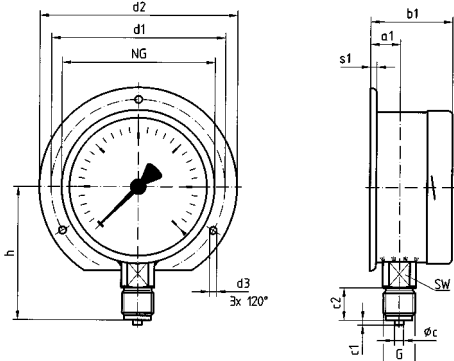
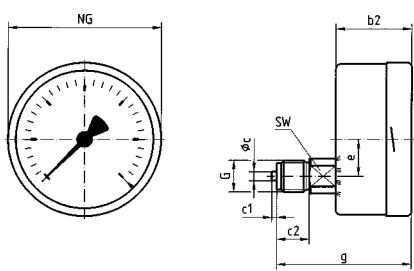
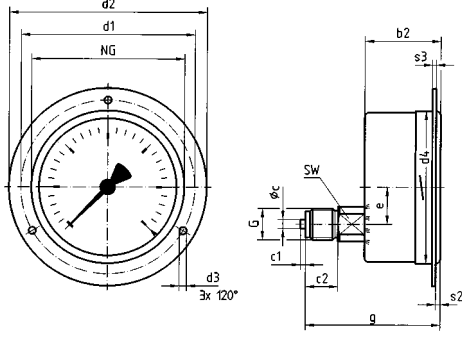
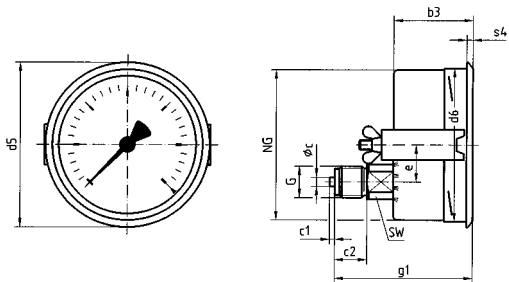
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Brass movement
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Special scales

Bourdon tube pressure gauges with glycerine filling, for chemical applications Type D 8 - NG 100/160

Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom connection, back flange</i> 
<i>Bottom back connection</i> 	<i>Bottom back connection, 3-hole fixing, panel mounting bezel</i> 
<i>Bottom back connection, panel mounting bezel for clamp fixing</i> 	

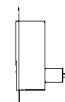
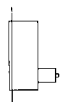
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2*	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	34.5	G ¹ / ₂ B	83	83	86	5.5
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	34.5	G ¹ / ₂ B	84	86	116	6
Nominal size (NG)	s2	s3	s4	SW																	
100	4	2	4	22																	
160	4	2	4.5	22																	

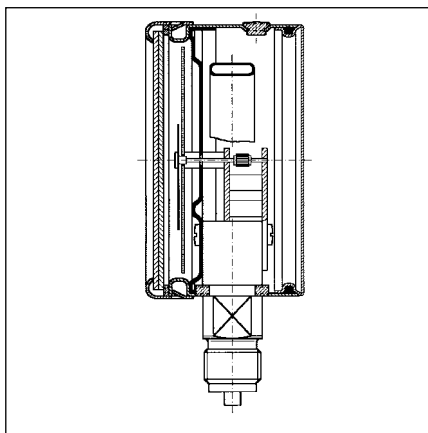
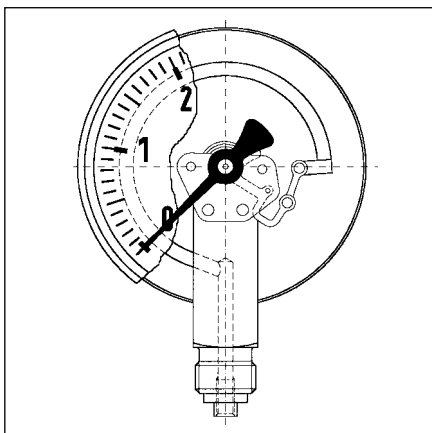
* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges with glycerine filling, for chemical applications EN 837-1

DG: M

Type	RF100ChGly, D802	RF100ChGly, D812	RF100ChGly, D832	RF100ChGly, D852	RF160ChGly, D802	RF160ChGly, D812	RF160ChGly, D832	RF160ChGly, D852
Version								
Housing-Ø	100	100	100	100	160	160	160	160
Housing	Stainless steel 1.4301 with bayonet type bezel, laminated safety front glass							
Meas. elem.	Bourdon tube, stainless steel 1.4571							
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B
			3-hole fixing, panel mounting bezel, 1.4301 polished	Panel mounting bezel, 1.4301 polished clamp fixing			3-hole fixing, panel mounting bezel, 1.4301 polished	Panel mounting bezel, 1.4301 polished clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85201802	85201812	85201832	85201852	85251802	85251812	85251832	85251852
-1/+0,6	85202802	85202812	85202832	85202852	85252802	85252812	85252832	85252852
-1/+1,5	85203802	85203812	85203832	85203852	85253802	85253812	85253832	85253852
-1/+3	85204802	85204812	85204832	85204852	85254802	85254812	85254832	85254852
-1/+5	85205802	85205812	85205832	85205852	85255802	85255812	85255832	85255852
-1/+9	85206802	85206812	85206832	85206852	85256802	85256812	85256832	85256852
-1/+15	85207802	85207812	85207832	85207852	85257802	85257812	85257832	85257852
Price €								
0/0,6	85209802	85209812	85209832	85209852	85259802	85259812	85259832	85259852
0/1	85210802	85210812	85210832	85210852	85260802	85260812	85260832	85260852
0/1,6	85211802	85211812	85211832	85211852	85261802	85261812	85261832	85261852
0/2,5	85212802	85212812	85212832	85212852	85262802	85262812	85262832	85262852
0/4	85213802	85213812	85213832	85213852	85263802	85263812	85263832	85263852
0/6	85214802	85214812	85214832	85214852	85264802	85264812	85264832	85264852
0/10	85215802	85215812	85215832	85215852	85265802	85265812	85265832	85265852
0/16	85216802	85216812	85216832	85216852	85266802	85266812	85266832	85266852
0/25	85217802	85217812	85217832	85217852	85267802	85267812	85267832	85267852
0/40	85218802	85218812	85218832	85218852	85268802	85268812	85268832	85268852
Price €								
0/60	85219802	85219812	85219832	85219852	85269802	85269812	85269832	85269852
0/100	85220802	85220812	85220832	85220852	85270802	85270812	85270832	85270852
0/160	85221802	85221812	85221832	85221852	85271802	85271812	85271832	85271852
0/250	85222802	85222812	85222832	85222852	85272802	85272812	85272832	85272852
0/400	85223802	85223812	85223832	85223852	85273802	85273812	85273832	85273852
Price €								
0/600	85224802	85224812	85224832	85224852	85274802	85274812	85274832	85274852
0/1000	85225802	85225812	85225832	85225852	85275802	85275812	85275832	85275852
0/1600	---	---	---	---	85276802	85276812	85276832	85276852

Bourdon tube safety pressure gauges EN 837-1



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. Suitable for use in corrosive atmospheres. This gauge is designed for applications according to EN 837-1/9.7.2.

Type

D 4

Nominal size

63

Accuracy class (EN 837-1/6)

1.6

(> 0/600 bar 2.5)

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/1,000 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +100\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ } \%$ /10K

falling temp. approx. $\pm 0.4\text{ } \%$ /10K

percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Stainless steel 1.4571, bottom or bottom back

G $\frac{1}{4}$ B- spanner size 14

(EN 837-1/7.3)

Measuring element

Bourdon tube, stainless steel 1.4571

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

leak tested (EN 837-1/9.5.6)

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with solid baffle wall and blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

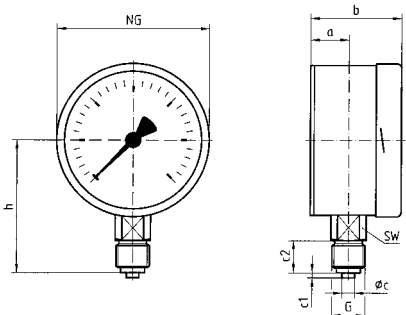
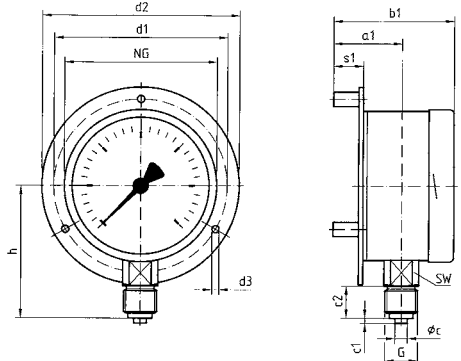
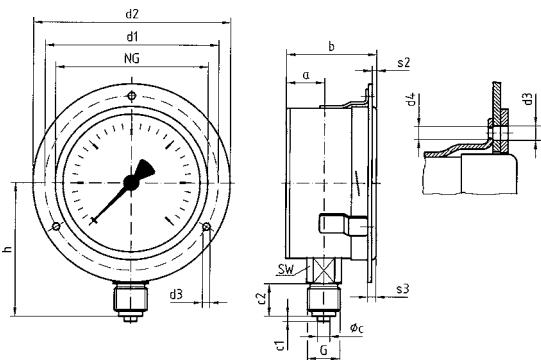
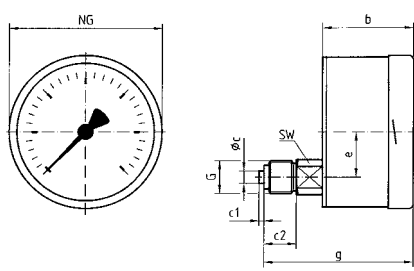
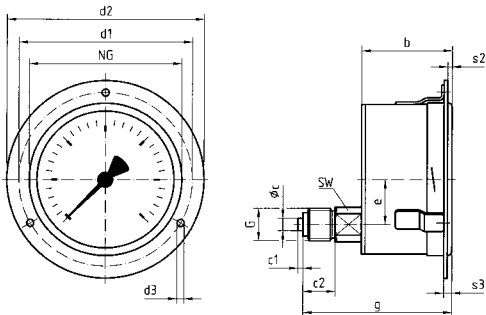
Laminated safety glass

Options

- Glycerine filling (type D 8)
- 3-hole fixing, panel mounting bezel

Bourdon tube safety pressure gauges *Type D 4 - NG 63*

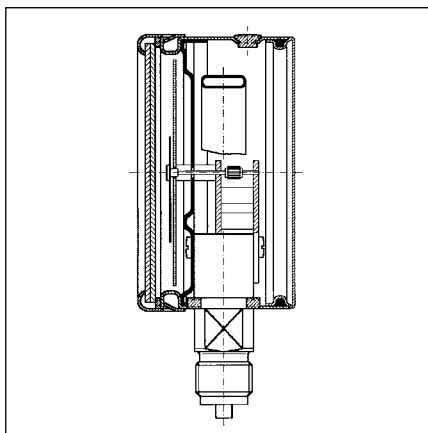
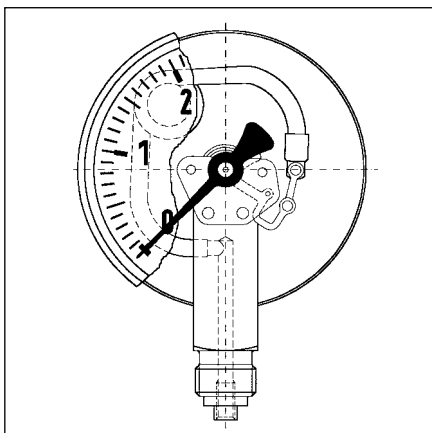
Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom connection, back flange</i> 
<i>Bottom connection, 3-hole fixing, panel mounting bezel</i> 	<i>Bottom back connection</i> 
<i>Bottom back connection, 3-hole fixing, panel mounting bezel</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1	d2	d3	d4	e	g	G	h	s1	s2	s3	SW
63	18	38	41	61	5	2	13	75	85	3.6	M3	18	60	G1/4B	54	21	3	5	14

Bourdon tube safety pressure gauges EN 837-1



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. Suitable for use in corrosive atmospheres. This gauge is designed for applications according to EN 837-1/9.7.2.

Type

D 4

Nominal size

100 - 160

Accuracy class (EN 837-1/6)

1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
 0/0.6 to 0/1,000 bar

Application area

Static load:

$\leq 600 \text{ bar} = \text{full scale value}$
 $> 600 \text{ bar} = \frac{3}{4} \times \text{full scale value}$

Dynamic load:

$\leq 600 \text{ bar} = 0.9 \times \text{full scale value}$
 $> 600 \text{ bar} = \frac{2}{3} \times \text{full scale value}$

Short term:

$\leq 600 \text{ bar} = 1.3 \times \text{full scale value}$
 $> 600 \text{ bar} = \text{full scale value}$

Operating temperature range

Medium: $T_{\max} = +100 \text{ }^{\circ}\text{C}$

Ambient: $T_{\min} = -20 \text{ }^{\circ}\text{C}$

$T_{\max} = +60 \text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20 \text{ }^{\circ}\text{C}$:
 rising temp. approx. $\pm 0.4 \text{ } \%/10\text{K}$
 falling temp. approx. $\pm 0.4 \text{ } \%/10\text{K}$
 percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Stainless steel 1.4571, bottom
 $G\frac{1}{2}B$ - spanner size 22
 (EN 837-1/7.3)

Measuring element

Bourdon tube, stainless steel 1.4571
 $\leq 60 \text{ bar}$ „C“ type bourdon tube,
 $> 60 \text{ bar}$ helical tube
 leak tested (EN837-1/9.5.6)

Movement

Stainless steel

Dial

Aluminium, white
 Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301
 with solid baffle wall and blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

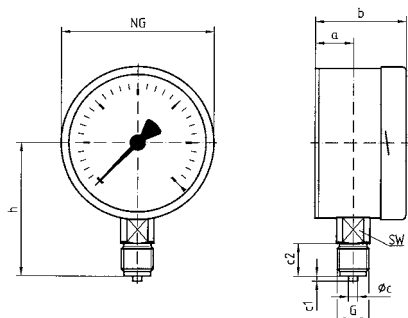
Options

- Glycerine filling (type D 8)
- 3-hole fixing, panel mounting bezel

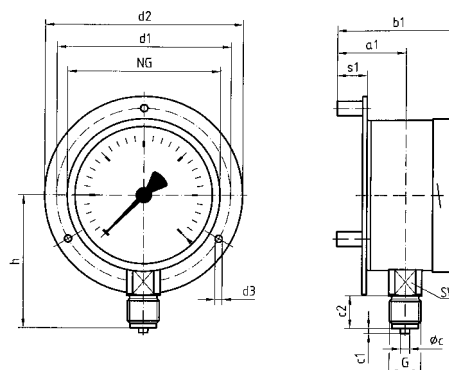
Bourdon tube safety pressure gauges Type D 4 - NG 100/160

Housing types and dimensions

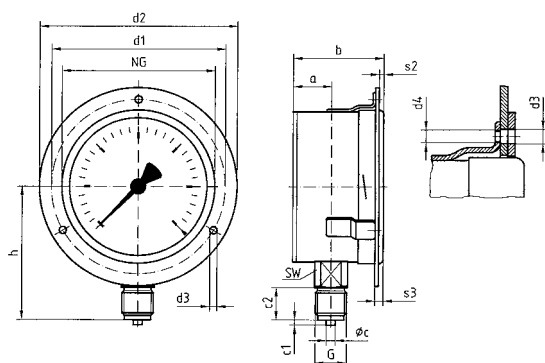
Bottom connection



Bottom connection, back flange



Bottom connection, 3-hole fixing, panel mounting bezel



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	d4	G	h	s1	s2	s3	SW
100	27	57	60	90	6	3	20	116	132	4.8	M4	G ¹ / ₂ B	87	32	3	5	22
160	40	70	78	108	6	3	20	178	196	5.8	M5	G ¹ / ₂ B	118	32	3	5	22

* Dimensions according to DIN EN 837-1

Bourdon tube safety pressure gauges EN 837-1

DG: H

with glycerine filling

Type	RF63Si, D402	RF63Si, D412	RF100Si, D402	RF160Si, D402	RF63SiGly, D802	RF63SiGly, D812	RF100SiGly, D802	RF160SiGly, D802
Version								
Housing-Ø	63	63	100	160	63	63	100	160
Housing	Stainless steel 1.4301 with bayonet type bezel, laminated safety front glass, blow-out							
Meas. elem.	Bourdon tube, stainless steel 1.4571							
Accuracy class	1.6*	1.6*	1.0	1.0	1.6*	1.6*	1.0	1.0
Connection	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₂ B	G ¹ / ₂ B
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85401402	85401412	85451402	85501402	85401802	85401812	85451802	85501802
-1/+0.6	85402402	85402412	85452402	85502402	85402802	85402812	85452802	85502802
-1/+1.5	85403402	85403412	85453402	85503402	85403802	85403812	85453802	85503802
-1/+3	85404402	85404412	85454402	85504402	85404802	85404812	85454802	85504802
-1/+5	85405402	85405412	85455402	85505402	85405802	85405812	85455802	85505802
-1/+9	85406402	85406412	85456402	85506402	85406802	85406812	85456802	85506802
-1/+15	85407402	85407412	85457402	85507402	85407802	85407812	85457802	85507802
Price €								
0/0.6	85409402	85409412	85459402	85509402	85409802	85409812	85459802	85509802
0/1	85410402	85410412	85460402	85510402	85410802	85410812	85460802	85510802
0/1.6	85411402	85411412	85461402	85511402	85411802	85411812	85461802	85511802
0/2.5	85412402	85412412	85462402	85512402	85412802	85412812	85462802	85512802
0/4	85413402	85413412	85463402	85513402	85413802	85413812	85463802	85513802
0/6	85414402	85414412	85464402	85514402	85414802	85414812	85464802	85514802
0/10	85415402	85415412	85465402	85515402	85415802	85415812	85465802	85515802
0/16	85416402	85416412	85466402	85516402	85416802	85416812	85466802	85516802
0/25	85417402	85417412	85467402	85517402	85417802	85417812	85467802	85517802
0/40	85418402	85418412	85468402	85518402	85418802	85418812	85468802	85518802
Price €								
0/60	85419402	85419412	85469402	85519402	85419802	85419812	85469802	85519802
0/100	85420402	85420412	85470402	85520402	85420802	85420812	85470802	85520802
Price €								
0/160	85421402	85421412	85471402	85521402	85421802	85421812	85471802	85521802
0/250	85422402	85422412	85472402	85522402	85422802	85422812	85472802	85522802
0/400	85423402	85423412	85473402	85523402	85423802	85423812	85473802	85523802
0/600	85424402	85424412	85474402	85524402	85424802	85424812	85474802	85524802
Price €								
0/1000	85425402	85425412	85475402	85525402	85425802	85425812	85475802	85525802

* > 0/600 bar class 2.5

Additional costs for Bourdon tube pressure gauges

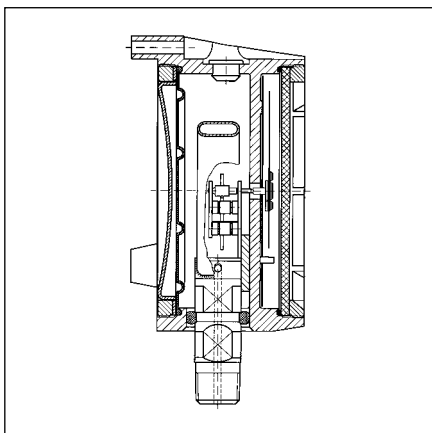
(industrial, glycerine, chemical, safety versions)

DG: M

Housing diameter (mm)	50	63	100	160
Description	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
Housing 1.4301 polished	38281	38282	38283	38284
Bayonet type bezel 1.4301 polished	---	38286	38287	38288
Crimped bezel 1.4301 polished	38289	38290	38291	---
Laminated safety front glass	---	38072	38074	38075
Connection socket nickel/chrome plated	38083	38084	38086	38087
Connection socket with special thread	on request	on request	on request	on request
Damping screw brass - hole 0.3 - 0.5 - 0.7 mm (please specify)	38096	38097	38099	38100
Damping screw stainless steel - hole 0.3 - 0.5 - 0.7 mm (please specify)	38102	38103	38105	38106
Red mark on dial	38183	38184	38186	38187
1 reference pointer red - external knob adjustment for gauges without filling (plastic front glass)	---	38188	38190	38191
1 reference pointer red - external knob adjustment for filled gauges (plastic front glass)	---	38301	38302	38303
Max. pointer for gauges without filling (only for gauges with bayonet type bezel, plastic front glass)	---	---	38129	38130
Max. pointer for filled gauges (only for gauges with bayonet type bezel, plastic front glass)	---	---	38306	38307
Knife edge pointer	---	38133	38135	38136
MICRO-adjustable pointer for zero correction	---	38335	38308	38309
Damped movement	on request	on request	38293	38294
Measuring system hard-soldered, suitable for T _{max} Medium temperature of +180 °C (Note: gauges with filling = T _{max} Medium temperature of +130 °C)	---	38295	38296	38297
Version suitable for high accuracy calibration approval, housing can be sealed, serial number on dial (only for housing with bayonet type bezel)	---	---	38298	38299
Special mounting position	38146	38147	38149	38150
Wetted parts cleaned for oxygen ¹⁾ – label „Oxygen“, „Free from oil and grease“ (only gauges without filling)	38138	38139	38141	38142
Higher protection IP 54 (only gauges with bayonet type bezel)	38310	38311	38312	38313
Printing block costs per scale and colour (scale design as per EN 837-1, others on request)	38152	38153	38155	38156
Printing costs per additional colour	38164	38165	38167	38168

¹⁾ Observe table „Selection criteria according to EN 837-2“ (refer to appendix)
Refer to „Accessories for panel mounting and wall mounting“ on page 383.

Bourdon tube pressure gauges type Process Gauge



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. Specially suitable for the oil and chemical industries.

Type

D 1

Nominal size

4 1/2"

Accuracy class

Grade 2A according to ANSI B 40.1 (corresponds to class 0.5)

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
0/0.6 to 0/1,000 bar

Application area

Static load:
full scale value
Dynamic load:
0.9 x full scale value
Short term:
1.3 x full scale value

Operating temperature range

Medium: $T_{max} = +100\text{ }^{\circ}\text{C}$
Ambient: $T_{min} = -40\text{ }^{\circ}\text{C}$
 $T_{max} = +65\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:
rising temp. approx. $\pm 0.3\text{ } \%$ /10K
falling temp. approx. $\pm 0.3\text{ } \%$ /10K
percentage of full scale value

Protection

IP 45 (EN 60529)

Standard version

Connection

Stainless steel AISI 316 Ti (1.4571),
bottom or bottom back
1/2-14 NPT - spanner size 22

Measuring element

Bourdon tube, stainless steel 1.4571
 $\leq 60\text{ bar}$ „C“ type bourdon tube
 $> 60\text{ bar}$ helical tube
leak tested (EN 837-1/9.5.6)

Movement

Stainless steel

Dial

Aluminium, white
Dial marking black

Pointer

Micro-adjustable pointer
Brass, black
Gear brass, nickel plated

Housing

PP-GF20, black
with solid baffle wall
and blow-out
Integrated back flange

Screw type bezel

PP-GF20, black
internal

Front glass

Plastic (PMMA)

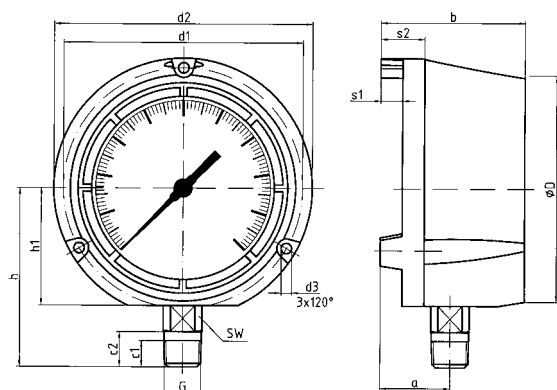
Options

- Glycerine filling (type D6)
- Silicone oil filling (type D6)
- Special scales
- Copper alloy measuring system
- Monel measuring system
- Laminated safety front glass
- Damping screw
- Reference pointer
- Max. pointer
- Electrical contacts

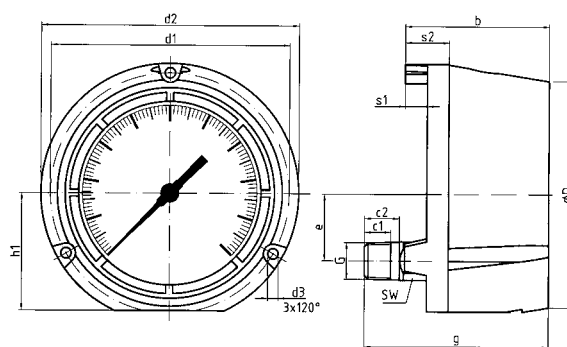
Bourdon tube pressure gauges type Process Gauge Class 0.5 Type D 1/D 6 - NG 4 1/2"

Housing types and dimensions

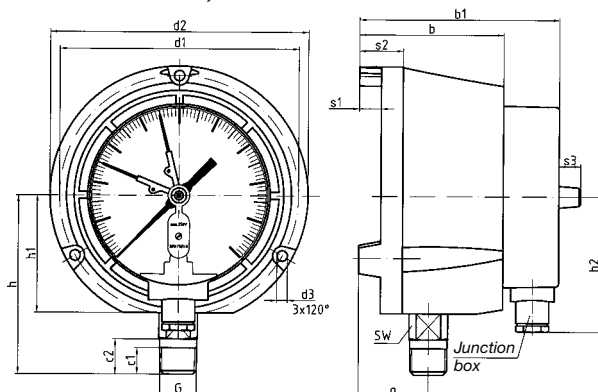
Bottom connection



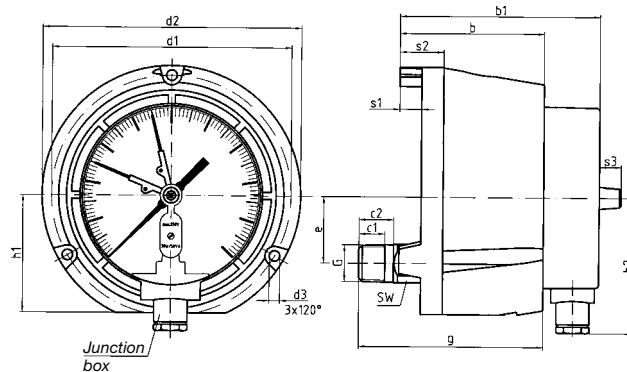
Bottom back connection



Bottom connection, with electrical contacts



Bottom back connection, with electrical contacts



Dimensions (mm)

Nominal size (NG)	a	b	b1	c1	c2	d1	d2	d3	ØD	e	G	g	h	h1	h2	s1	s2	s3	SW
4 1/2" (D 1/D 6)	40	82.5	114.5	15	20	137	148	6	129	38	1/2-14 NPT	105.5	102	67	78	12.5	25	12.5	22

Bourdon tube pressure gauges type Process Gauge

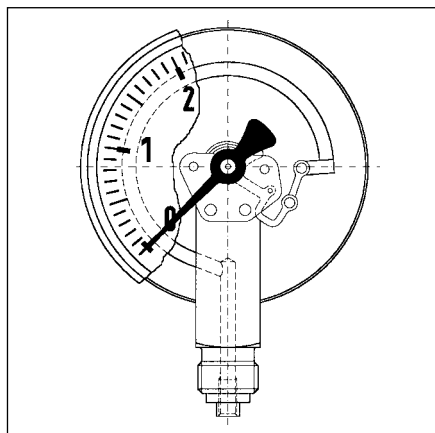
DG: M

with glycerine filling

Type	RF130PG, D101	RF130PG, D111	RF130PG, D102	RF130PG, D112	RF130PG, D601	RF130PG, D611	RF130PG, D602	RF130PG, D612
Version								
Housing Ø	4 1/2"	4 1/2"	4 1/2"	4 1/2"	4 1/2"	4 1/2"	4 1/2"	4 1/2"
Housing	PP-GF 20, black, with internal screw type bezel							
Meas. elem.	Copper alloy		Stainless steel 1.4571		Copper alloy		Stainless steel 1.4571	
Accuracy class	Grade 2A according to ANSI B 40.1 (corresponds to class 0.5)							
Connection	1/2-14 NPT	1/2-14 NPT	1/2-14 NPT	1/2-14 NPT	1/2-14 NPT	1/2-14 NPT	1/2-14 NPT	1/2-14 NPT
Range (bar)*	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	87901101	87901111	87901102	87901112	87901601	87901611	87901602	87901612
-1/+0.6	87902101	87902111	87902102	87902112	87902601	87902611	87902602	87902612
-1/+1.5	87903101	87903111	87903102	87903112	87903601	87903611	87903602	87903612
-1/+3	87904101	87904111	87904102	87904112	87904601	87904611	87904602	87904612
-1/+5	87905101	87905111	87905102	87905112	87905601	87905611	87905602	87905612
-1/+9	87906101	87906111	87906102	87906112	87906601	87906611	87906602	87906612
-1/+15	87907101	87907111	87907102	87907112	87907601	87907611	87907602	87907612
Price €								
0/0.6	87909101	87909111	87909102	87909112	87909601	87909611	87909602	87909612
0/1	87910101	87910111	87910102	87910112	87910601	87910611	87910602	87910612
0/1.6	87911101	87911111	87911102	87911112	87911601	87911611	87911602	87911612
0/2.5	87912101	87912111	87912102	87912112	87912601	87912611	87912602	87912612
0/4	87913101	87913111	87913102	87913112	87913601	87913611	87913602	87913612
0/6	87914101	87914111	87914102	87914112	87914601	87914611	87914602	87914612
0/10	87915101	87915111	87915102	87915112	87915601	87915611	87915602	87915612
0/16	87916101	87916111	87916102	87916112	87916601	87916611	87916602	87916612
0/25	87917101	87917111	87917102	87917112	87917601	87917611	87917602	87917612
0/40	87918101	87918111	87918102	87918112	87918601	87918611	87918602	87918612
Price €								
0/60	87919101	87919111	87919102	87919112	87919601	87919611	87919602	87919612
0/100	87920101	87920111	87920102	87920112	87920601	87920611	87920602	87920612
0/160	87921101	87921111	87921102	87921112	87921601	87921611	87921602	87921612
0/250	87922101	87922111	87922102	87922112	87922601	87922611	87922602	87922612
0/400	87923101	87923111	87923102	87923112	87923601	87923611	87923602	87923612
Price €								
0/600	87924101	87924111	87924102	87924112	87924601	87924611	87924602	87924612
0/1000	87925101	87925111	87925102	87925112	87925601	87925611	87925602	87925612

* psi graduation available at no additional cost.

Precision Bourdon tube pressure gauges Class 0.6



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and are not aggressive.
For high measuring accuracy.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

160 - 250

Accuracy class (EN 837-1/6)

0.6

Ranges (EN 837-1/5)

-1/0 bar to -1/+15 bar

0/0.6 to 0/600 bar

Calibration medium

≤ 40 bar: air

> 40 bar: water

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ }%$ /10K

falling temp. approx. $\pm 0.4\text{ }%$ /10K

percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Brass, bottom or bottom back (only NG 160)

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Measuring element

Bourdon tube element,

≤ 100 bar „C“ type bourdon tube, copper alloy

> 100 bar helical tube, stainless steel 1.4571

Movement

Brass/nickel silver

jewel bearing

Dial

Aluminium, white

Dial marking black

Pointer

Knife edge pointer

Aluminium, black

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Plastic (PMMA)

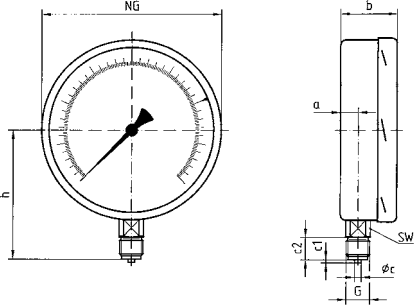
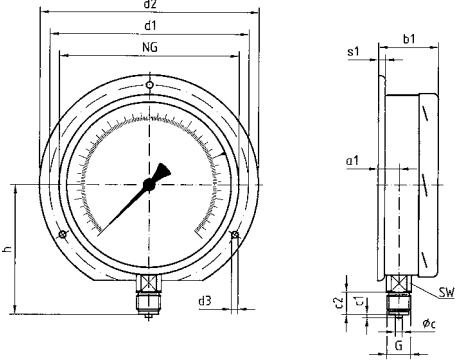
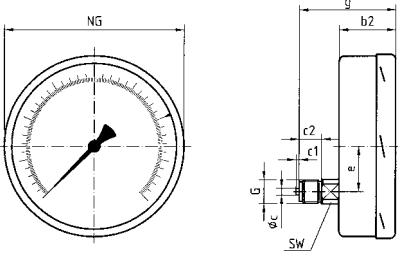
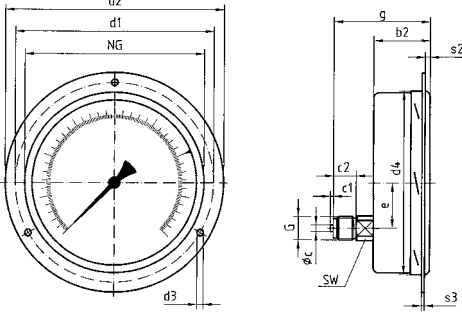
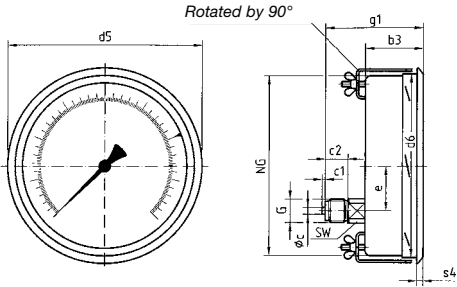
Options

- Glycerine filling (NG 160/type D 8)
- Wetted parts stainless steel (type D 4 x 2)
- Laminated safety front glass (NG 160)
- Back flange (NG 160)
- 3-hole fixing, panel mounting bezel (NG 160)
- Damping screw

Precision Bourdon tube pressure gauges Class 0.6

Type D 4 - NG 160/250

Housing types and dimensions

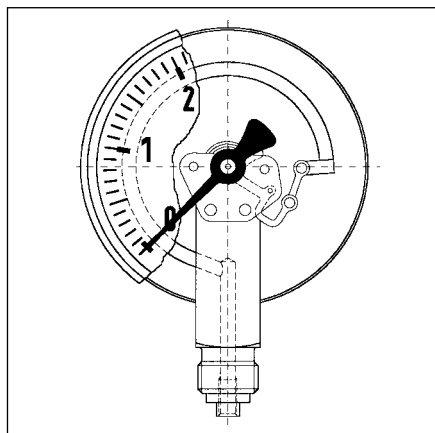
<i>Bottom connection</i> 	<i>Bottom connection, back flange, (NG 160 only)</i> 
<i>Bottom back connection (NG 160 only)</i> 	<i>Bottom back connection, 3-hole fixing, panel mounting bezel (NG 160 only)</i> 
<i>Bottom back connection, panel mounting bezel, clamp fixing (NG 160 only)</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	44.5	G ¹ / ₂ B	82	84	116	6
250	16	-	57	-	-	-	6	3	20	-	-	-	-	-	-	-	G ¹ / ₂ B	-	-	165	-
Nominal size (NG)	s2	s3	s4	SW																	
160	4	2	4.5	22																	
250	-	-	-	22																	

* Dimensions according to DIN EN 837-1

Precision Bourdon tube pressure gauges Class 0.25



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and are not aggressive. For very high measuring accuracy.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

160 - 250

Accuracy class (EN 837-1/6)

0.25

Ranges (EN 837-1/5)

-1/0 bar to -1/+15 bar

0/0.6 to 0/400 bar

Calibration medium

≤ 40 bar: air

> 40 bar: water

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ ‰} / 10\text{K}$

falling temp. approx. $\pm 0.4\text{ ‰} / 10\text{K}$

percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Brass, bottom or bottom back

(only NG 160)

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Measuring element

Bourdon tube element,

≤ 100 bar „C“ type bourdon tube,

copper alloy

> 100 bar helical tube, copper alloy

Movement

Brass/nickel silver

ball bearing

Dial

Aluminium, white

Dial marking black

NG 160 mirror scale 270°

NG 250 mirror scale 330°

with zero correction

Pointer

Knife edge pointer

Aluminium

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Plastic (PMMA)

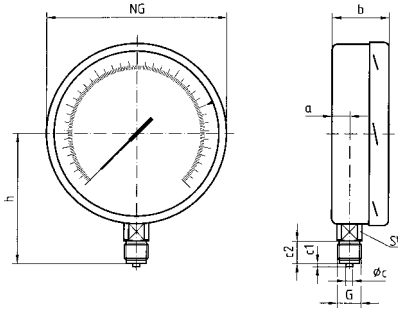
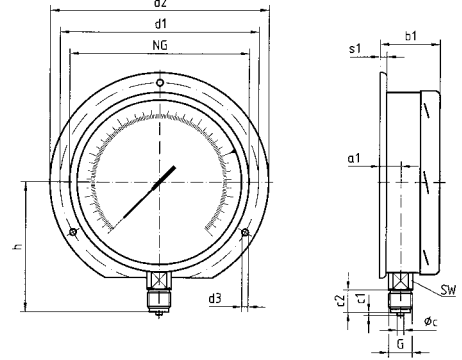
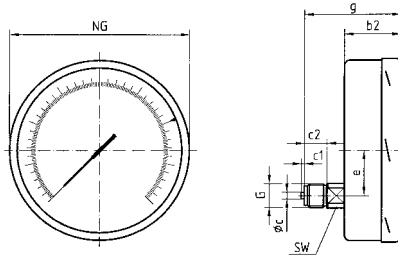
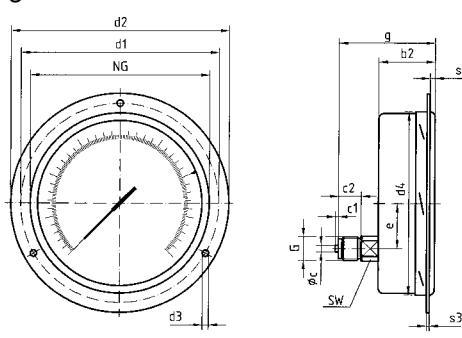
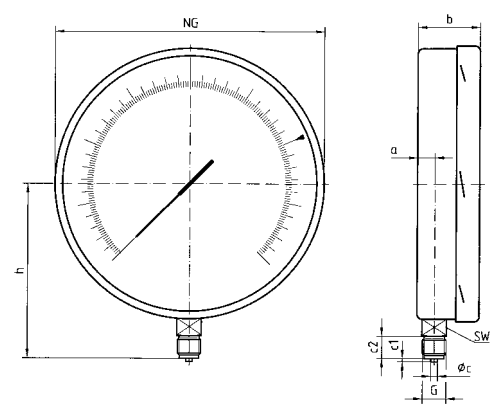
Options

- Back flange (NG 160)
- 3-hole fixing, panel mounting bezel (NG 160)
- Factory test certificate

Precision Bourdon tube pressure gauges Class 0.25

Type D 4 - NG 160/250

Housing types and dimensions

Bottom connection - NG 160 	Bottom connection, back flange - NG 160 
Bottom back connection - NG 160 	Bottom back connection, 3-hole fixing, panel mounting bezel - NG 160 
Bottom connection - NG 250 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	44.5	G ¹ / ₂ B	82	84	116	6
250	16	-	57	-	-	-	6	3	20	-	-	-	-	-	-	-	G ¹ / ₂ B	-	-	165	-
Nominal size (NG)	s2	s3	s4	SW																	
160	4	2	4.5	22																	
250	-	-	-	22																	

* Dimensions according to DIN EN 837-1

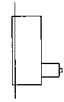
Precision Bourdon tube pressure gauges Class 0.6

DG: M

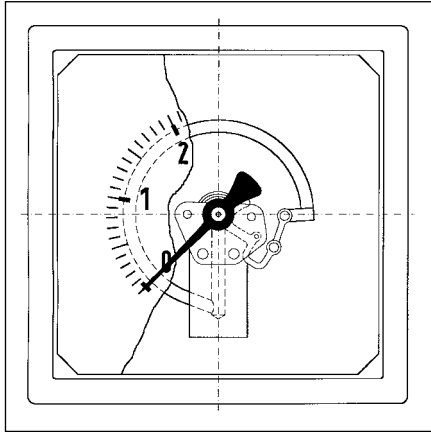
Type	RF160F,D401	RF160F,D411	RF160F,D431		RF160ChF,D402	RF160ChF,D412	RF160ChF,D432	RF250F,D401
Version								
Housing Ø	160	160	160		160	160	160	250
Housing	Stainless steel 1.4301 with bayonet type bezel							
Meas. elem.	Bourdon tube element, copper alloy				Bourdon tube, stainless steel 1.4571			Cu alloy
Accuracy class	0.6	0.6	0.6		0.6	0.6	0.6	0.6
Connection	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B		G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B
			3-hole fixing, panel mounting bezel, 1.4301				3-hole fixing, panel mounting bezel, 1.4301	
Range (bar)	Part no.	Part no.	Part no.		Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85701401	85701411	85701431		85701402	85701412	85701432	85751401
-1/+0.6	85702401	85702411	85702431		85702402	85702412	85702432	85752401
-1/+1.5	85703401	85703411	85703431		85703402	85703412	85703432	85753401
Price €								
-1/+3	85704401	85704411	85704431		85704402	85704412	85704432	85754401
-1/+5	85705401	85705411	85705431		85705402	85705412	85705432	85755401
-1/+9	85706401	85706411	85706431		85706402	85706412	85706432	85756401
-1/+15	85707401	85707411	85707431		85707402	85707412	85707432	85757401
Price €								
0/0.6	85709401	85709411	85709431		85709402	85709412	85709432	85759401
0/1	85710401	85710411	85710431		85710402	85710412	85710432	85760401
0/1.6	85711401	85711411	85711431		85711402	85711412	85711432	85761401
Price €								
0/2.5	85712401	85712411	85712431		85712402	85712412	85712432	85762401
0/4	85713401	85713411	85713431		85713402	85713412	85713432	85763401
0/6	85714401	85714411	85714431		85714402	85714412	85714432	85764401
0/10	85715401	85715411	85715431		85715402	85715412	85715432	85765401
0/16	85716401	85716411	85716431		85716402	85716412	85716432	85766401
0/25	85717401	85717411	85717431		85717402	85717412	85717432	85767401
0/40	85718401	85718411	85718431		85718402	85718412	85718432	85768401
Price €								
0/60	85719401	85719411	85719431		85719402	85719412	85719432	85769401
0/100	85720401	85720411	85720431		85720402	85720412	85720432	85770401
0/160	85721401	85721411	85721431		85721402	85721412	85721432	85771401
0/250	85722401	85722411	85722431		85722402	85722412	85722432	85772401
0/400	85723401	85723411	85723431		85723402	85723412	85723432	85773401
0/600	85724401	85724411	85724431		85724402	85724412	85724432	85774401
Additional cost for glycerine filling (> 2.5 bar)								

Precision Bourdon tube pressure gauges Class 0.25

DG: M

Type	RF160F,D401	RF160F,D411	RF160F,D431		RF250F,D401			
Version								
Housing Ø	160	160	160		250			
Housing	Stainless steel 1.4301 with bayonet type bezel							
Meas. elem.	Copper alloy							
Dial	mirror scale 270°				330°			
Accuracy class	0.25	0.25	0.25		0.25			
Connection	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B		G ¹ / ₂ B			
			3-hole fixing, panel mounting bezel, 1.4301					
Range (bar)	Part no.	Part no.	Part no.		Part no.			
Price €								
-1/0	88201401	88201411	88201431		88231401			
-1/+0.6	88202401	88202411	88202431		88232401			
-1/+1.5	88203401	88203411	88203431		88233401			
-1/+3	88204401	88204411	88204431		88234401			
-1/+5	88205401	88205411	88205431		88235401			
-1/+9	88206401	88206411	88206431		88236401			
-1/+15	88207401	88207411	88207431		88237401			
0/0.6	88209401	88209411	88209431		88239401			
0/1	88210401	88210411	88210431		88240401			
0/1.6	88211401	88211411	88211431		88241401			
0/2.5	88212401	88212411	88212431		88242401			
Price €								
0/4	88213401	88213411	88213431		88243401			
0/6	88214401	88214411	88214431		88244401			
0/10	88215401	88215411	88215431		88245401			
0/16	88216401	88216411	88216431		88246401			
0/25	88217401	88217411	88217431		88247401			
0/40	88218401	88218411	88218431		88248401			
Price €								
0/60	88219401	88219411	88219431		88249401			
0/100	88220401	88220411	88220431		88250401			
0/160	88221401	88221411	88221431		88251401			
0/250	88222401	88222411	88222431		88252401			
0/400	88223401	88223411	88223431		88253401			
0/600	---	---	---		---			
Price €								
0/1000	---	---	---		---			

Bourdon tube pressure gauges for panel mounting



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys. For panel mounting.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 2/D 3

Nominal size

72 x 72, 96 x 96, 144 x 144

Accuracy class (EN 837-1/6)

72 x 72 - 96 x 96: 1.6

144 x 144: 1.0

Ranges (EN 837-1/5)

-1/0 bar to -1/+15 bar

0/0.6 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Brass, centre back

72 x 72 - 96 x 96:

G $\frac{1}{4}$ B - spanner size 14

144 x 144:

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

NG 72/NG 96 D3 – stainless steel 1.4301

NG 144 D2 – sheet steel, black

Bezel

NG 72/NG 96 aluminium, black

NG 144 sheet steel, black

Front glass

Plastic

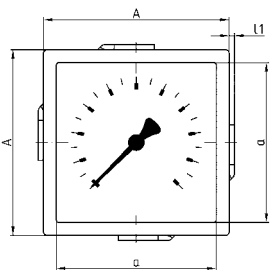
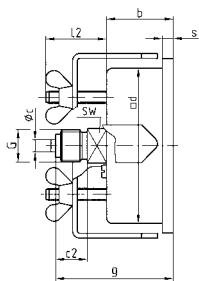
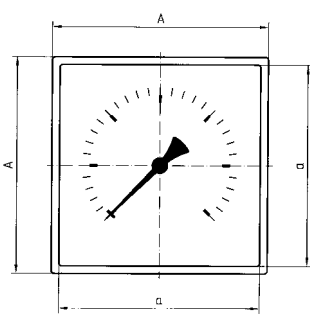
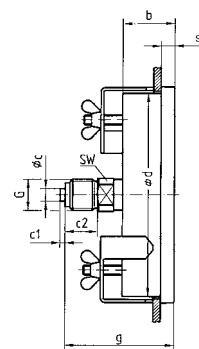
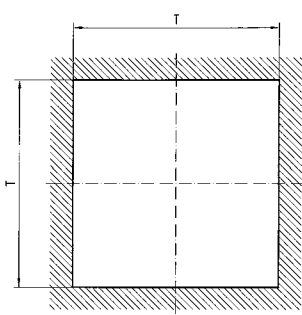
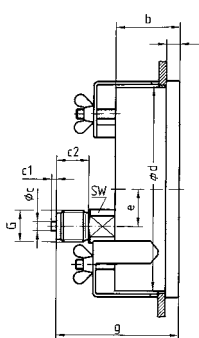
Options

- Zero correction (NG 96)
- Wetted parts stainless steel (NG 72/NG 96)
- Damping screw
- Reference pointer

Bourdon tube pressure gauges for panel mounting

NG 72 x 72/96 x 96/144 x 144

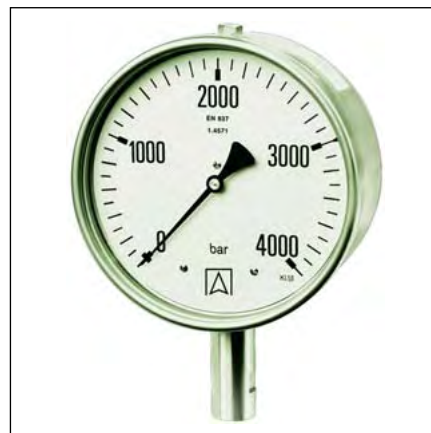
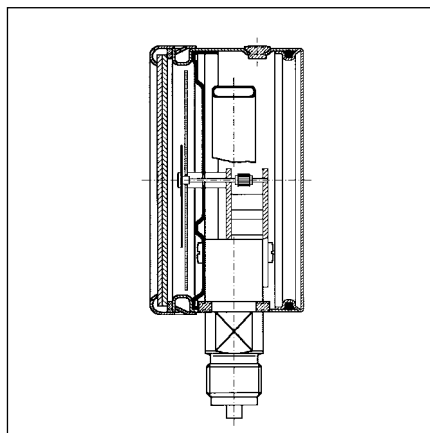
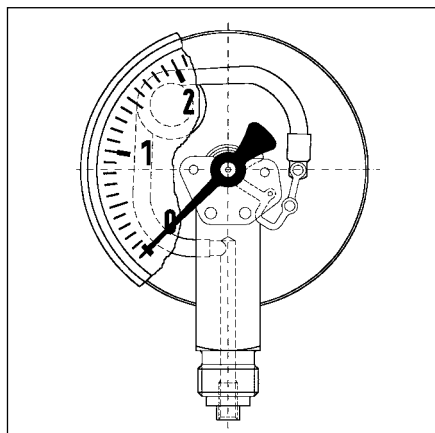
Housing types and dimensions

NG 72 x 72 – type D 3 	NG 72 x 72 – type D 3 
NG 96 x 96 – type D 3/NG 144 x 144 – type D 2 	NG 96 x 96 – type D 3 
Panel cut-out 	NG 144 x 144 – type D 2 

Dimensions (mm)

Nominal size (NG)	A	a	b	Øc	c1	c2	d	e	G	g	l1	l2	s	SW	T
72 x 72	72	62	27.5	5	2	13	64	-	G1/4B	44.5	2	25	4.5	14	66
96 x 96	96	88	32	5	2	13	88	-	G1/4B	55	-	-	6.5	14	90
144 x 144	144	134	49	6	3	20	136	26.5	G1/2B	81	-	-	9	22	138

Bourdon tube pressure gauges for high pressures EN 837-1



Application

For measurement of extremely high pressures in corrosive, gaseous and liquid media which are not highly viscous and do not crystallize. Suitable for use in corrosive atmospheres.

Type
D 4

Nominal size
160

Accuracy class (EN 837-1/6)
1.0

Ranges
0/2,500 bar
0/4,000 bar

Application area

Static load:
full scale value
Dynamic load:
 $\frac{3}{4}$ x full scale value

Operating temperature range

Medium: $T_{max} = +100\text{ }^{\circ}\text{C}$
Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$
 $T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:
rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$
falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$
percentage of full scale value

Protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 1.4571, bottom
HP connection for $\frac{1}{4}$ " pipe
Female thread M 16 x 1.5
or 9/16-18 UNF
each with sealing cone 60°

Measuring element
Bourdon tube element, NiFe alloy
helical tube

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301
with solid baffle wall and blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

Mounting

Wall mounting instrument bracket with 60 mm protrusion (included in scope of delivery) or panel mounting using 3-hole fixing, panel mounting bezel (option).
Direct mounting onto rigid measuring pipe possible.

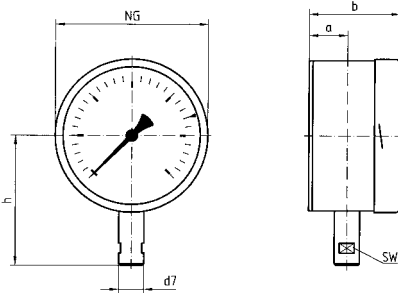
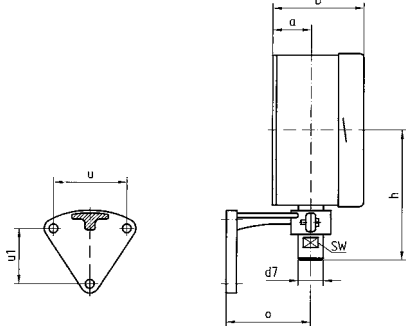
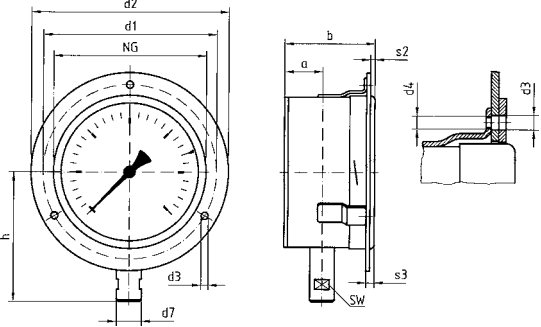
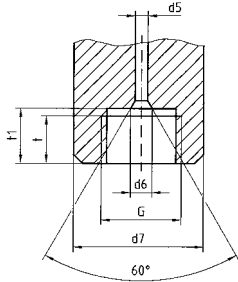
Options

- Nominal size 100
- Glycerine filling (type D802)
- 3-hole fixing, panel mounting bezel
- Other connections
- Electrical contacts

Bourdon tube pressure gauges for high pressures

Type D 4 - NG 160

Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom connection, with instrument holder</i> 
<i>Bottom connection, 3-hole fixing, panel mounting bezel</i> 	<i>HP connection, female thread M 16 x 1.5</i> 

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	d1*	d2	d3*	d4	d5	d6	d7	G	h	o	s	s1	s2	s3	t	t1	u
160	34	64	78	108	178	196	5.8	M 5	2.5	4.3	26	M 16x1.5 HP	139	63	22	32	7	9	9.5	11	65
Nominal size (NG)	u1	SW																			
160	56	22																			

* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges for panel mounting

Bourdon tube pressure gauges for high pressures

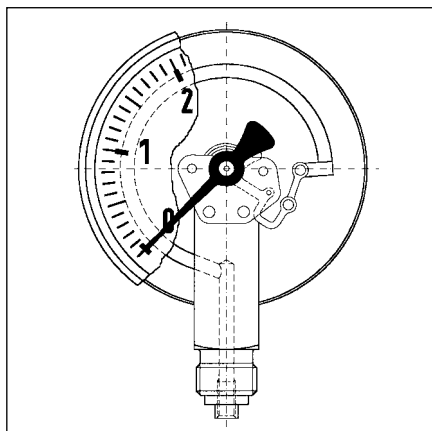
DG: M

Glycerine filling

Glycerine filling

Type	RF72, D311	RF96, D311	RF144, D211	RF96, D312	RF100HDGly, D802	RF160HD, D402	RF160HDGly, D802
Version							
Housing Ø	72 x 72	96 x 96	144 x 144	96 x 96	100	160	160
Housing	Stainless steel	Stainless steel	Sheet steel	Stainless steel	Stainless steel 1.4301		
Meas. elem.	Bourdon tube element, copper alloy			Stainless steel	Stainless steel 1.4571/NiFe		
Accuracy class	1.6	1.6	1.0	1.6	1.0	1.0	1.0
Connection	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₂ B	G ¹ / ₄ B	G ¹ / ₂ B	HP connection 1/4" with female thread M16 x 1.5 or 9/16-18 UNF with sealing cone 60°	
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	85828311	85801311	85851211	85801312	---	---	---
-1/+0.6	85844311	85802311	85852211	85802312	---	---	---
-1/+1.5	85845311	85803311	85853211	85803312	---	---	---
-1/+3	85846311	85804311	85854211	85804312	---	---	---
-1/+5	85847311	85805311	85855211	85805312	---	---	---
-1/+9	85848311	85806311	85856211	85806312	---	---	---
-1/+15	85849311	85807311	85857211	85807312	---	---	---
Price €							
0/0.6	85829311	85809311	85859211	85809312	---	---	---
0/1	85830311	85810311	85860211	85810312	---	---	---
0/1.6	85831311	85811311	85861211	85811312	---	---	---
0/2.5	85832311	85812311	85862211	85812312	---	---	---
0/4	85833311	85813311	85863211	85813312	---	---	---
0/6	85834311	85814311	85864211	85814312	---	---	---
0/10	85835311	85815311	85865211	85815312	---	---	---
0/16	85836311	85816311	85866211	85816312	---	---	---
0/25	85837311	85817311	85867211	85817312	---	---	---
0/40	85838311	85818311	85868211	85818312	---	---	---
Price €							
0/60	85839311	85819311	85869211	85819312	---	---	---
0/100	85840311	85820311	85870211	85820312	---	---	---
0/160	85841311	85821311	85871211	85821312	---	---	---
0/250	85842311	85822311	85872211	85822312	---	---	---
0/400	85843311	85823311	85873211	85823312	---	---	---
Price €							
0/2500	---	---	---	---	86031802	85277402	85277802
Price €							
0/4000	---	---	---	---	---	85278402	85278802

Bourdon tube pressure gauges with glycerine filling for refrigeration applications



Application

For simultaneous measurement of vapour pressures and temperatures in refrigeration applications.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 7/D 8

Nominal size

63 - 80 - 100 (D 7)

100 (D 8)

Accuracy class (EN 837-1/6)

NG 63: 1.6

NG 80/NG 100: 1.0

Ranges

-1/+ 9 bar

-1/+12.5 bar

-1/+15 bar

-1/+24 bar

-1/+30 bar

each with temperature scale

Temperature scales for cooling agent:

R 134a

R 134a/R 22

R 22/R 12/R 502

R 12

R 404A

R 407A

R 410A

R 717 (NH₃) - wetted parts stainless steel 1.4571

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: according to cooling agent

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ %}/10\text{K}$

falling temp. approx. $\pm 0.4\text{ %}/10\text{K}$

percentage of full scale value

Protection

IP 65 (EN 60529),

with housing vent (< 25 bar)

IP 54

Standard version

Connection

Brass, bottom or back

NG 63 - 100 D 7 centre back

NG 100 D 8 bottom back

7/16-20 UNF, G $\frac{1}{4}$ B, G $\frac{1}{2}$ B

(stainless steel 1.4571 for R 717)

Measuring element

Bourdon tube element, copper alloy „C“ type bourdon tube

(stainless steel 1.4571 for R 717)

Movement

Brass

Dial

Aluminium, white

Pressure dial marking black

Temperature dial marking coloured (refer to appendix for examples)

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with blow-out

Bezel

D 7 - NG 63 - 80 - 100:

Crimped bezel stainless steel 1.4301

D 8 - NG 100:

Bayonet type bezel stainless steel 1.4301

Front glass

Plastic

Filling liquid

Glycerine (99.5 %)

Options

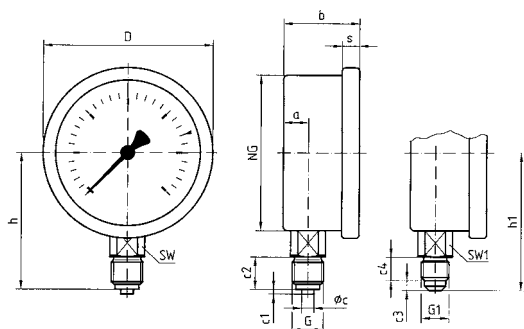
- Temperature scales for other cooling agents
- Back flange
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 63/100)
- Damping screw

Bourdon tube pressure gauges for refrigeration applications

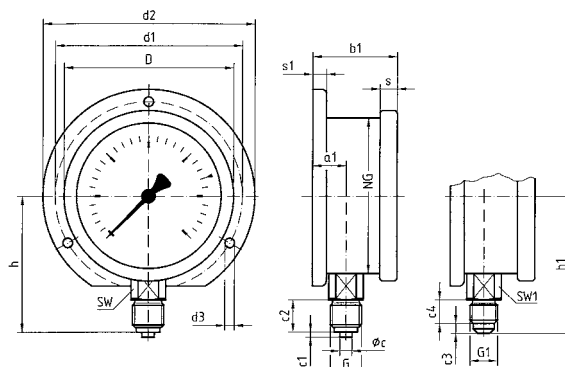
Type D 7/D 8 – NG 63/80/100

Housing types and dimensions

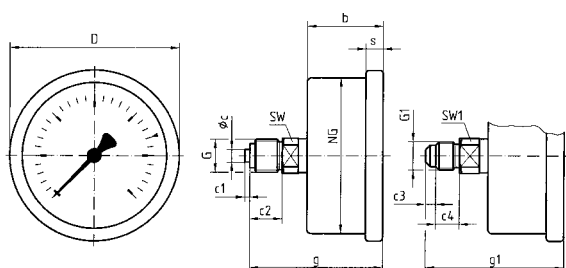
Type D 7 – bottom connection



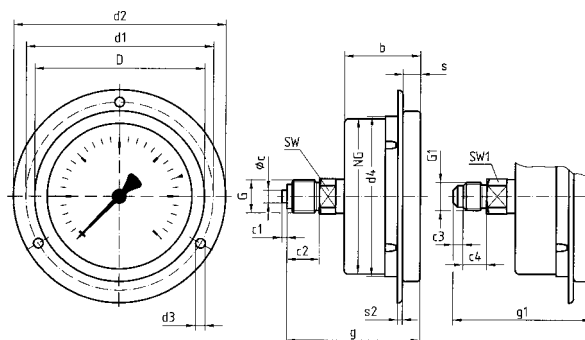
Type D 7 - bottom connection, back flange



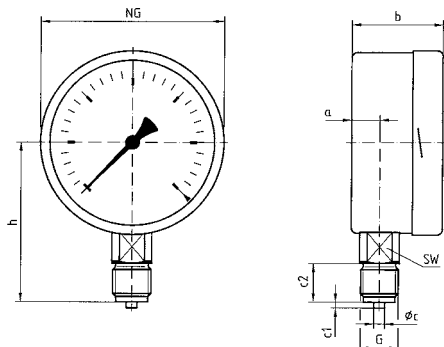
Type D 7 – centre/bottom back connection



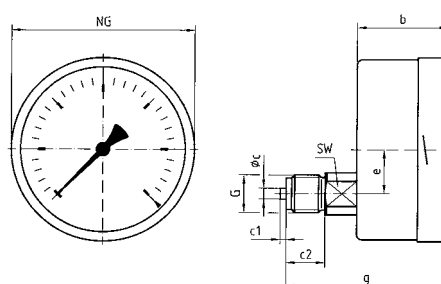
Type D 7 – centre/bottom back connection, 3-hole fixing, panel mounting bezel (NG 63/100)



Type D 8 – bottom connection



Type D 8 – bottom back connection



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	c3	c4	d1*	d2*	d3*	d4	D	e	g	g1	G	G1	h	h1
63 (D 7)	9.5	13	30.5	34	5	2	13	4	9.5	75	85	3.6	64	68	-	53.5	55.5	G1/4B	7/16-20 UNF	53	55
80 (D 7)	12.2	15.2	33.5	36.5	6	3	20	4	9.5	95	110	5	-	85	-	65.5	58.5	G1/2B	7/16-20 UNF	71	62.5
100 (D 7)	12.2	15.7	33.5	37	6	3	20	4	9.5	116	132	4.8	101	106	-	65.5	58.5	G1/2B	7/16-20 UNF	81	72.5
100 (D 8)	15.6	19.1	49	52.5	6	3	20	-	-	-	-	-	-	-	26.5	81	-	G1/2B	-	86	-
Nominal size (NG)	s	s1	s2	SW	SW1																
63 (D 7)	7	5.5	2	14	14																
80 (D 7)	7	5.5	-	22	14																
100 (D 7)	7	5.5	3.8	22	14																
100 (D 8)	-	5.5	2	22	-																

Bourdon tube pressure gauges with glycerine filling for refrigeration applications

DG: M

Type	RF63KTGly, D701	RF63KTGly, D711	RF80KTGly, D701	RF80KTGly, D711	RF100KTGly, D701	RF100KTGly, D711	RF100KTGly, D802	RF100KTGly, D812
Version								
Housing Ø	63	63	80	80	100	100	100	100
Housing	Stainless steel 1.4301 with crimped bezel						Stainless steel 1.4301 with bayonet type bezel	
Meas. elem.	Bourdon tube element, copper alloy						Stainless steel 1.4571	
Scale	according to selection table						Temperature scale R 717	
Accuracy class	1.6	1.6	1.0	1.0	1.0	1.0	1.0	1.0
Connection*	7/16-20 UNF	7/16-20 UNF	7/16-20 UNF	7/16-20 UNF	7/16-20 UNF	7/16-20 UNF	G ¹ / ₂ B	G ¹ / ₂ B
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/+9	85130701	85130711	85180701	85180711	85230701	85230711	---	---
-1/+12.5	85131701	85131711	85181701	85181711	85231701	85231711	85231802	85231812
-1/+15	85132701	85132711	85182701	85182711	85232701	85232711	85232802	85232812
-1/+24	85133701	85133711	85183701	85183711	85233701	85233711	85233802	85233812
-1/+30	85134701	85134711	85184701	85184711	85234701	85234711	---	---
Add. costs	Price €							
Wetted parts 1.4571*							---	

Refer to pages 308 and 383 for additional costs.

Selection table - temperature scales for cooling agents (refer to appendix for examples)

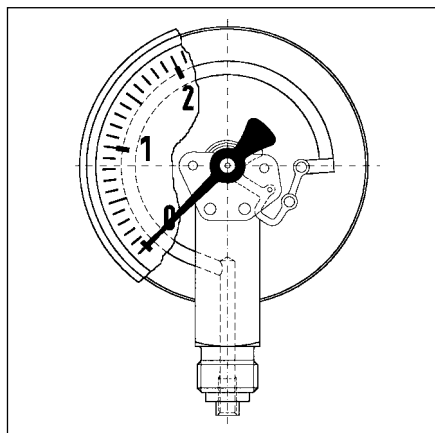
Please specify the code of the required temperature scale along with the part number of the basic gauge.

Temperature scales for other cooling agents on request.

Temperature scale for cooling agent	Code
R 134a	A
R 134a/R 22	B
R 22/R 12/R 502	C
R 12	D
R 404A	E
R 717 (NH ₃) – stainless steel 1.4571 with wetted parts only	F
R 407A	G

* Connection NG 63/80 centre back G¹/₄B – NG 80 bottom/100 G¹/₂B for stainless steel wetted parts.

Bourdon tube pressure gauges for welding applications EN 562



Application

For welding systems and cutting machines or similar processes.

Type

D 2/D 3

Nominal size

50 - 63

Version

EN 562

Accuracy class (EN 562)

2.5

Ranges (EN 562)

0/1 to 0/400 bar
-1/0 to -1/+15 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ \%/10K}$

falling temp. approx. $\pm 0.4\text{ \%/10K}$

percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Brass, bottom or centre back, with damping in the pressure inlet

G $\frac{1}{4}$ B - spanner size 14

(EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 40\text{ bar}$ „C“ type bourdon tube

$> 40\text{ bar}$ helical tube

(copper portion in case of acetylene $< 70\text{ \%$)

Degree of cleanliness

Wetted parts are oil and grease free.

Movement

Brass

Dial

Aluminium, white

Dial marking black

Marking

„Oxygen“ for oxygen and symbol for „free from oil and grease“

„Acetylene“ for acetylene

Pointer

Aluminium, black

Housing

D 2 - sheet steel (gold or black)

D 3 - stainless steel 1.4301 with rear blow-out

Front glass

Plastic, snap-in

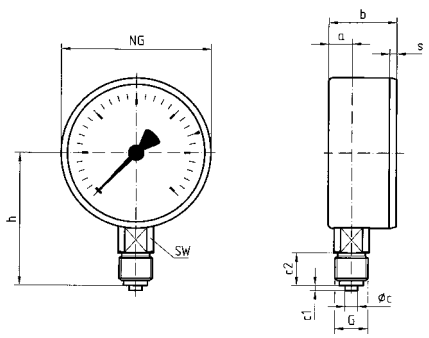
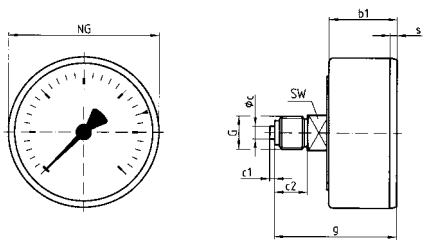
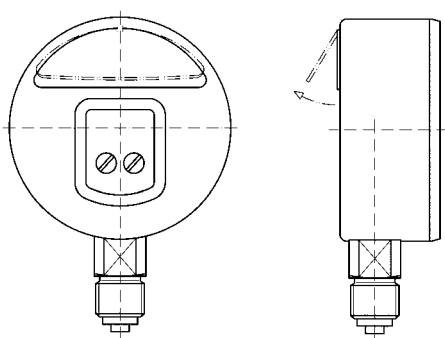
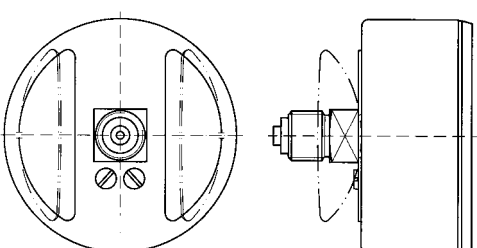
Options

- Litre scale for argon/CO₂
- Other connection threads

Bourdon tube pressure gauges for welding applications

Type D 3 – NG 50/63

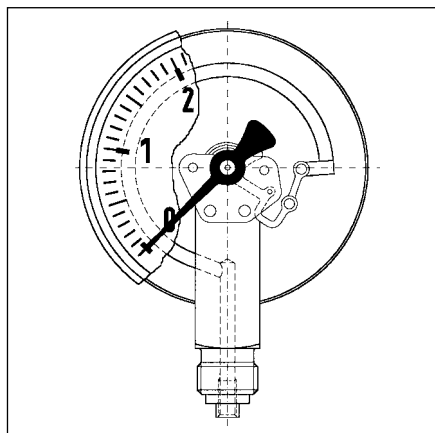
Housing types and dimensions

<i>Bottom connection</i> 	<i>Centre back connection</i> 
<i>Blow-out - bottom connection</i> 	<i>Blow-out - centre back connection</i> 

Dimensions (mm)

Nominal size (NG)	a	b	b1	Øc	c1	c2	G	g	h	s	SW				
50	10.5	29	26	5	2	13	G ¹ / ₄ B	47	46	3.8	14				
63	11	29.5	29.5	5	2	13	G ¹ / ₄ B	50.5	53	3.7	14				

Bourdon tube pressure gauges for gas applications EN 837-1 (S2)



Application

For gaseous and liquid media which are not highly viscous and do not crystallize. Especially designed for gas technology fittings and installations.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 3

Nominal size

50 - 63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
0/1 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$
percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Brass, bottom or centre back

G $\frac{1}{4}$ B - spanner size 14

(EN 837-1/7.3)

Measuring element

Bourdon tube element, copper alloy

$\leq 40\text{ bar}$ „C“ type bourdon tube

$> 40\text{ bar}$ helical tube

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with rear blow-out according to EN 562

Front glass

Plastic, snap-in

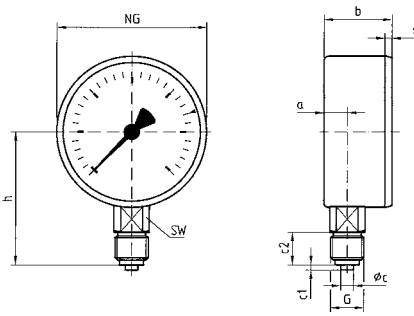
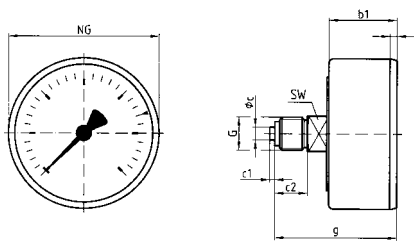
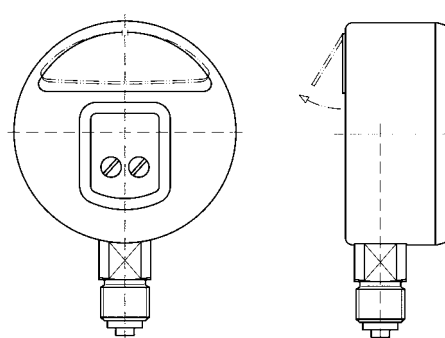
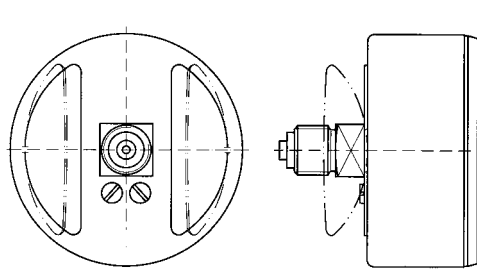
Options

- Wetted parts stainless steel
- Wetted parts oil and grease free
- Helium leak test
- Other connection threads
- Damping screw

Bourdon tube pressure gauges for gas applications

Type D 3 – NG 50/63

Housing types and dimensions

<i>Bottom connection</i> 	<i>Centre back connection</i> 
<i>Blow-out - bottom connection</i> 	<i>Blow-out - centre back connection</i> 

Dimensions (mm)

Nominal size (NG)	a	b	b1	Øc	c1	c2	G	g	h	s	SW				
50	10.5	29	26	5	2	13	G ¹ / ₄ B	47	46	3.8	14				
63	11	29.5	29.5	5	2	13	G ¹ / ₄ B	50.5	53	3.7	14				

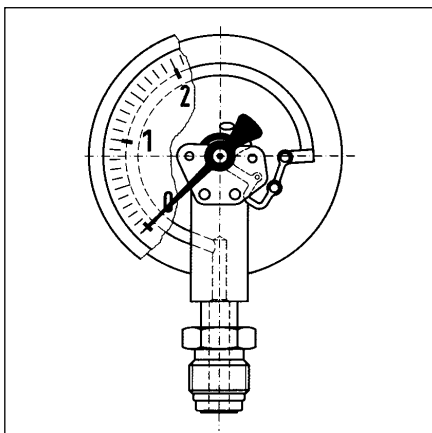
Bourdon tube pressure gauges for welding/ gas applications

DG: M Version for welding applications EN 562

Type	RF63ST, D301	RF50GT, D301	RF50GT, D311	RF63GT, D301	RF63GT, D311	RF50GT, D302 ⁴⁾	RF63GT, D302 ⁴⁾
Version							
Housing Ø	63	50	50	63	63	50	63
Housing	Stainless steel 1.4301 with blow-out						
Meas. elem.	CU alloy, oil and grease free	Copper alloy				Stainless steel 1.4571	
Accuracy class	2.5	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B	G ¹ / ₄ B
Range bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	---	85051301GT	85051311GT	85101301GT	85101311GT	85051302GT	85101302GT
-1/+0.6	---	85052301GT	85052311GT	85102301GT	85102311GT	85052302GT	85102302GT
-1/+1.5	---	85053301GT	85053311GT	85103301GT	85103311GT	85053302GT	85103302GT
-1/+3	---	85054301GT	85054311GT	85104301GT	85104311GT	85054302GT	85104302GT
-1/+5	---	85055301GT	85055311GT	85105301GT	85105311GT	85055302GT	85105302GT
-1/+9	---	85056301GT	85056311GT	85106301GT	85106311GT	85056302GT	85106302GT
-1/+15	---	85057301GT	85057311GT	85107301GT	85107311GT	85057302GT	85107302GT
Price €							
0/0.6	---	85059301GT	85059311GT	85109301GT	85109311GT	85059302GT	85109302GT
0/1	88300301 ¹⁾	85060301GT	85060311GT	85110301GT	85110311GT	85060302GT	85110302GT
0/1.6	88301301 ¹⁾	85061301GT	85061311GT	85111301GT	85111311GT	85061302GT	85111302GT
0/2.5	88302301 ¹⁾	85062301GT	85062311GT	85112301GT	85112311GT	85062302GT	85112302GT
0/4	88303301	85063301GT	85063311GT	85113301GT	85113311GT	85063302GT	85113302GT
0/6	88304301 ²⁾	85064301GT	85064311GT	85114301GT	85114311GT	85064302GT	85114302GT
0/10	88305301	85065301GT	85065311GT	85115301GT	85115311GT	85065302GT	85115302GT
0/10	88306301 ³⁾	---	---	---	---	---	---
0/16	88307301 ²⁾	85066301GT	85066311GT	85116301GT	85116311GT	85066302GT	85116302GT
0/25	88308301	85067301GT	85067311GT	85117301GT	85117311GT	85067302GT	85117302GT
0/40	88309301 ¹⁾	85068301GT	85068311GT	85118301GT	85118311GT	85068302GT	85118302GT
0/40	88310301 ²⁾	---	---	---	---	---	---
Price €							
0/60	---	85069301GT	85069311GT	85119301GT	85119311GT	85069302GT	85119302GT
0/100	---	85070301GT	85070311GT	85120301GT	85120311GT	85070302GT	85120302GT
0/160	---	85071301GT	85071311GT	85121301GT	85121311GT	85071302GT	85121302GT
0/250	88314301	85072301GT	85072311GT	85122301GT	85122311GT	85072302GT	85122302GT
0/315	88315301 ²⁾	85073301GT	85073311GT	85123301GT	85123311GT	85073302GT	85123302GT
0/315	88316301	---	---	---	---	---	---
0/400	88317301	85073301GT	85073311GT	85123301GT	85123311GT	85073302GT	85123302GT

1) with inscription „Acetylene“ 2) with inscription „Oxygen“ 3) Scale 0/30 l/min „Argon“ red, 0/28 l/min „CO₂“ black
4) additional costs for back connection – refer to page 308 for other additional costs

Bourdon tube pressure gauges for ultra-pure gas applications



Application

Designed for highly demanding applications where product surface quality and absolute purity of wetted parts are of utmost importance, particularly for measuring ultra-pure gases.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 3

Nominal size

63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar

0/0.6 to 0/400 bar

Calibration medium

Nitrogen

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{3}{4}$ x full scale value

Short term:

full scale value

Operating temperature range

Medium: $T_{max} = +150\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$
percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Bottom, either:

1/4-18 NPT

9/16-18 UNF, with pressure screw

9/16-18 UNF, with union nut

Measuring element

Bourdon tube element

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

leak tested (helium), leak rate

$< 10^{-9}\text{ mbar x l/s}$

Wetted parts

Connection stainless steel 1.4404

Measuring element stainless steel 1.4571

ultrasonically cleaned, flushed with nitrogen, electrolytically polished, surface roughness $\leq Ra\ 0.6\text{ }\mu\text{m}$

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Label „Ultra-pure gas“

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with rear blow-out

Push on bezel

Stainless steel 1.4301, bare metal surface

Front glass

Plastic

Options

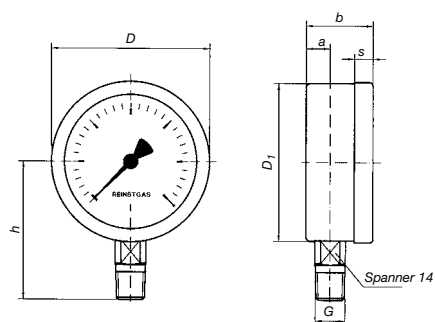
- Surface roughness $Ra\ 0.4/0.25\text{ }\mu\text{m}$
- Housing polished
- Push-on bezel polished
- Electrical contacts

Bourdon tube pressure gauges for ultra-pure gas applications

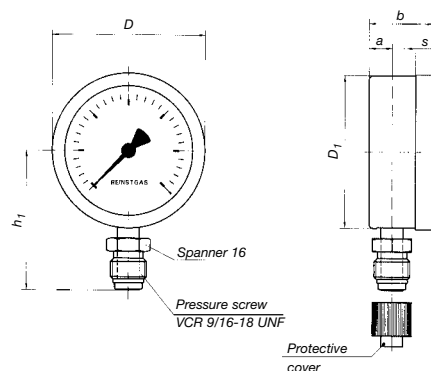
Type D 3 – NG 63

Housing types and dimensions

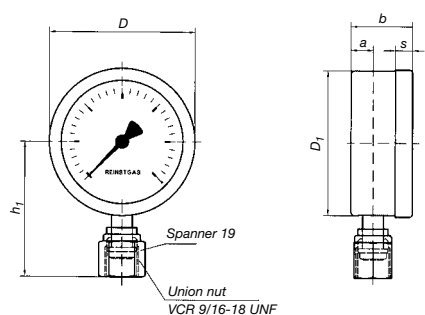
Bottom connection, 1/4-18 NPT



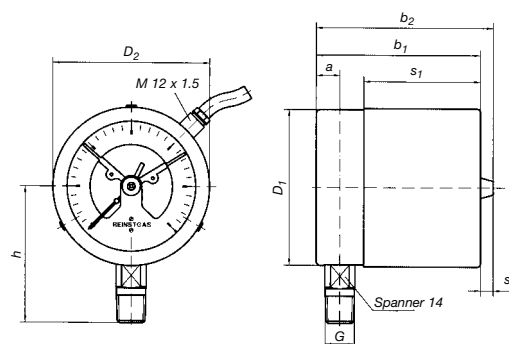
Bottom connection, 9/16-18 UNF, with pressure screw



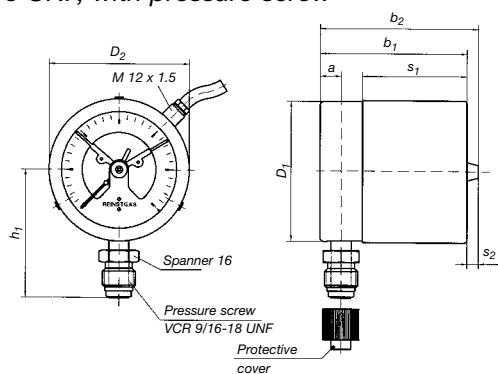
Bottom connection, 9/16-18 UNF, with union nut



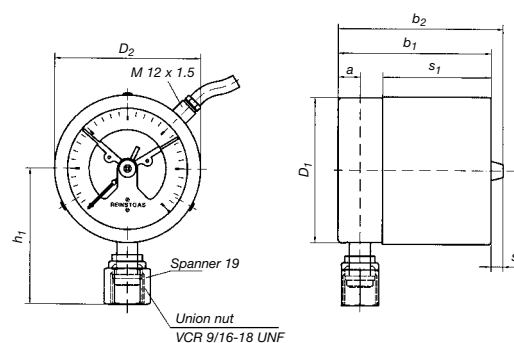
Version with contacts - bottom connection, 1/4-18 NPT



Version with contacts – bottom connection, 9/16-18 UNF, with pressure screw



Version with contacts – bottom connection, 9/16-18 UNF, with union nut



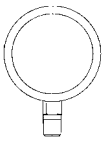
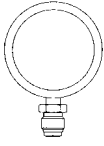
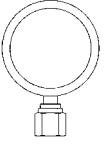
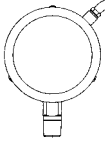
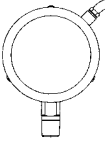
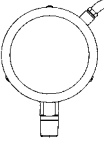
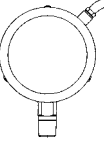
Dimensions (mm)

Nominal size (NG)	a	b	b ₁	b ₂	D	D ₁	D ₂	G	h	h ₁	S	S ₁	S ₂		
63	9	28	66	74	63	62	64	1/4-18 NPT	54	57	8	48	8		

Bourdon tube pressure gauges for ultra-pure gas applications

DG: M

with electrical contact

Type	RF63RG, D302	RF63RG, D302	RF63RG, D302		RF63RG,MK1,D302	RF63RG,MK2,D302	RF63RG,IK1,D302	RF63RG,IK2,D302
Version								
Housing Ø	63	63	63		63	63	63	63
Housing	Stainless steel 1.4301 with push on bezel, plastic front glass							
Meas. sys	Connection stainless steel 1.4404/measuring element stainless steel 1.4571							
Accuracy class	1.6	1.6	1.6		1.6	1.6	1.6	1.6
Connection	1/4-18 NPT	9/16-18 UNF, with pressure screw	9/16-18 UNF, with union nut		1/4-18 NPT	1/4-18 NPT	1/4-18 NPT	1/4-18 NPT
Range (bar)	Part no.	Part no.	Part no.		Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	87001302	87051302	87101302		---	---	---	---
-1/+0.6	87002302	87052302	87102302		87352302	87202302	87252302	87302302
-1/+1.5	87003302	87053302	87103302		87353302	87203302	87253302	87303302
-1/+3	87004302	87054302	87104302		87354302	87204302	87254302	87304302
-1/+5	87005302	87055302	87105302		87355302	87205302	87255302	87305302
-1/+9	87006302	87056302	87106302		87356302	87206302	87256302	87306302
-1/+15	87007302	87057302	87107302		87357302	87207302	87257302	87307302
Price €								
0/0.6	87009302	87059302	87109302		---	---	---	---
0/1	87010302	87060302	87110302		---	---	---	---
0/1.6	87011302	87061302	87111302		87361302	87211302	87261302	87311302
0/2.5	87012302	87062302	87112302		87362302	87212302	87262302	87312302
0/4	87013302	87063302	87113302		87363302	87213302	87263302	87313302
0/6	87014302	87064302	87114302		87364302	87214302	87264302	87314302
0/10	87015302	87065302	87115302		87365302	87215302	87265302	87315302
0/16	87016302	87066302	87116302		87366302	87216302	87266302	87316302
0/25	87017302	87067302	87117302		87367302	87217302	87267302	87317302
0/40	87018302	87068302	87118302		87368302	87218302	87268302	87318302
Price €								
0/60	87019302	87069302	87119302		87369302	87219302	87269302	87319302
0/100	87020302	87070302	87120302		87370302	87220302	87270302	87320302
0/160	87021302	87071302	87121302		87371302	87221302	87271302	87321302
0/250	87022302	87072302	87122302		87372302	87222302	87272302	87322302
0/400	87023302	87073302	87123302		87373302	87223302	87273302	87323302
	Additional cost for 9/16-18 UNF pressure screw or union nut							

Electrical contacts - electromechanical



Electrical contacts – electromechanical

General

Electrical contacts in measuring devices with pointers are auxiliary electrical switches which open or close electrical circuits at set limit values by means of a contact arm which is moved in accordance with the indicated value.

They consist of:

- an adjustable red setting pointer
- a carrier arm which is connected to the setting pointer and which carries the contact pin
- a contact arm which is moved by the gauge pointer and which carries the second contact pin

A contact adjustment lock allows the user to adjust the setting pointer to the value at which the device is to switch.

The gauge pointer can move beyond the adjusted setting pointer after the contact has been made. However, the contact remains active.

Two types of contacts are available: magnetic spring contacts and sliding contacts.



Magnetic spring contact

Principle of operation

Magnetic spring contacts have a permanent magnet screwed to the setting pointer at the contact carrier arm.

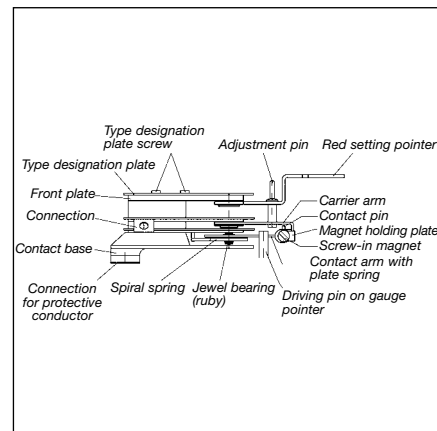
To close the circuit, the contact pin of the moving contact arm is attracted by the magnet and the contact closes.

When the circuit opens, the magnet attracts the contact arm until the resetting force of the measuring element overcomes the effective force of the magnet and the contact opens again.

The snap action reduces arcing between the contacts, thus allowing for greater switch ratings. Due to the increased contact force, this type of contact is also less sensitive to vibrations. Furthermore, the stability of contact is increased by greater contact pressure.

Application

Magnetic spring contacts can be used under almost any type of operating condition. They can also be integrated into gauges with filling.



In order to prevent switching errors (particularly in the case of greater inductive switch ratings or considerable system vibration or in gauges with filling) we recommend installing our pulse-controlled series MSR contact protection relays.

Technical specifications

Nominal supply voltage

250 V max.

Making and breaking current

1.0 A max.

Permanent current

0.6 A max.

Switch rating

30 W 50 VA max.

Contact material

Ag80 Ni20 Au 10 μ (additional cost for special materials)

Switching accuracy

approx. 2-5 % of full scale value

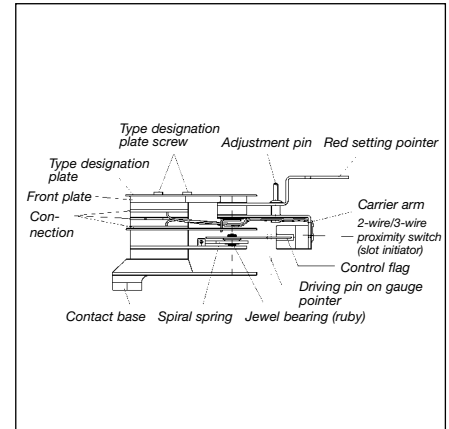
Operating temperature range

-20 °C/+70 °C, depending on type of gauge

Adjustment range

5-95 % of the gauge measuring range

Electrical contacts - electronic



Electronic contact

General

Electronic contacts have non-contacting electrical displacement pick-ups (proximity switches). They consist of:

- an adjustable red setting pointer
- a carrier arm which is connected to the setting pointer and which carries the control head with the complete, encapsulated electronics
- a control flag which is moved by the gauge pointer

A contact adjustment lock allows the user to adjust the setting pointer to the value at which the unit has to switch.

The gauge pointer can move beyond the adjusted setting pointer after the contact has been made. However, the contact remains active.

Principle of operation

The slot type proximity switches used in the electronic contacts are simple 2-wire or 3-wire DC voltage switches.

Due to the slot design, the proximity switches are also referred to as slot initiators.

The electromagnetic field is concentrated between two opposing coils. The switch is activated when the aluminium control flag moved by the gauge pointer reaches the gap between the two coils (slot). The signal is generated without a delay, according to the movement of the gauge pointer.

The switching behaviour of the PNP switches used in these contacts is usually defined as a normally open contact, i.e.:

Control flag in the slot initiator

- contact closed
- output active

Control flag not in the slot initiator

- contact open
- output not active

Application

Due to the non-contacting switching procedure, the high switching accuracy and the long service life, electronic contacts with PNP output are ideal for any type of industrial application.

The use of these contacts is particularly advantageous in applications with liquid filled measuring instruments, at low voltages (DC 10-30 V) and low DC loads (≤ 100 mA), e.g.

- for PLC signal input
- to control opto-isolators
- for other electronic evaluation units

Version

Standard electronic contacts are shipped with a 3-wire initiator type Si2-K08-AP6. The contacts are also available with the Si2-K08-AG6 2-wire initiator.

Technical specifications

Supply voltage

DC 10 - 30 V

Switch rating

≤ 100 mA

Switching accuracy

approx. 0.5 % of full scale value

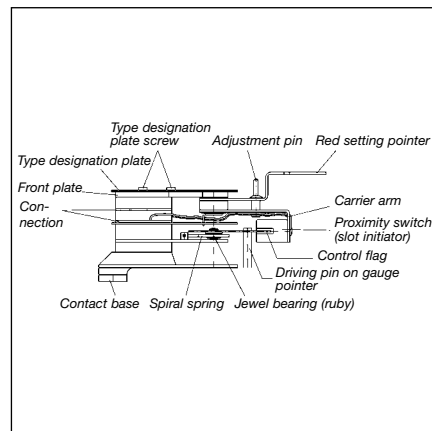
Operating temperature range

-25 °C/+70 °C, depending on type of gauge

Adjustment range

5-95 % of the gauge measuring range

Electrical contacts - inductive



Inductive contact

General

Inductive contacts have non-contact electric displacement pickups according to EN 60947-5-6 or NAMUR.

They consist of:

- an adjustable red setting pointer
- a carrier arm which is connected to the setting pointer and which carries the control head with the complete, encapsulated electronics
- a control flag which is moved by the gauge pointer

A contact adjustment lock allows the user to adjust the setting pointer to the value at which the unit has to switch.

The gauge pointer can move beyond the adjusted setting pointer after the contact has been made. However, the contact remains active.

Principle of operation

Inductive contacts are used in connection with a switching amplifier. The amplifier supplies the control head with direct voltage. As soon as the control flag reaches the control head, the internal resistance in the control head increases (high ohmic initiator).

This causes the current to change and is used to control the switching amplifier.

The amplifier converts the input signal into a binary output signal.

Therefore, the switching function of inductive contacts is not only determined by the slot initiator, but also by the switching amplifier.

Application

Due to the non-contacting switching, the high switching accuracy and the long service life, inductive contacts are ideal for industrial applications and should be used in liquid filled gauges.

Inductive contacts are particularly recommended when the switching frequency is very high and when highest demands are made on reliability.

The electronics are fully encapsulated, therefore this type of contact is also suitable for use in areas with corrosive atmospheres.

If suitable isolating switching amplifiers are used (such as KFA6-SR2-Ex), the system will conform to the hazardous area classification „intrinsic safety i“. It will be classified as  II 2G EEx ia IIC T6 or  II 1G EEx ia IIC T6 and may be used in hazardous areas zones 1 and 2. The isolating switching

amplifier, however, must always be installed in the safe area, e.g. outside the hazardous area.

For standard industrial applications not requiring Ex protection, we recommend our cost-efficient multifunctional series MSR-I relays

Technical specifications

Nominal voltage

8 V = (Ri 1 kOhm)

Supply voltage

5-25 V

Current input

3 mA (active area free)

1 mA (active area covered)

Switching accuracy

approx. 0.5 % of full scale value

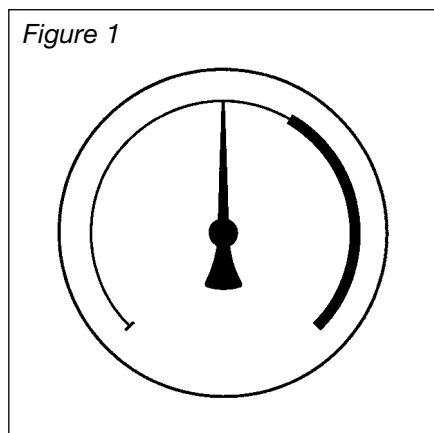
Operating temperature range

-20 °C/+70 °C, depending on type of gauge

Adjustment range

5-95 % of the gauge measuring range

Switching functions and definitions



Definition of switching function

- 1** = Contact closes clockwise when the set point is reached.
- 2** = Contact opens clockwise when the set point is reached.
- W** = 1 contact opens and 1 contact closes at the same time (changeover).

The switching function of a contact is always specified in terms of a clockwise movement of the pointer.

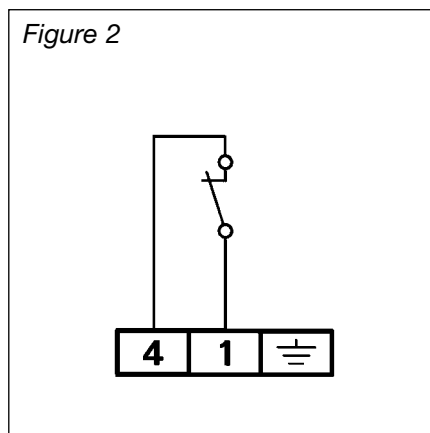
If the actual gauge pointer moves counter-clockwise, the switching function is inverted!

Where several contacts are fitted to a gauge, the contact closest to the left end of the scale is defined as the „first“ contact.

This also applies to vacuum ranges!

Optimisation of the switching performance

Application related information, such as the directional movement of the contact pointer (e.g. contact switches with increasing or decreasing pressure), the switch point setting or the speed of pressure changes, help to optimise contact adjustment to achieve a more accurate switching performance.



Selection table for switching functions

The selection tables for switching functions on pages 338 and 339 list the switching functions of single, double and the most common triple contacts (with switching/wiring diagram).

This chart facilitates the quick and easy finding of the correct contact designation for the required switching function.

Description of the switching scheme

Figure 1:

- thin line = contact open, circuit open
- thick line = contact closed, circuit closed

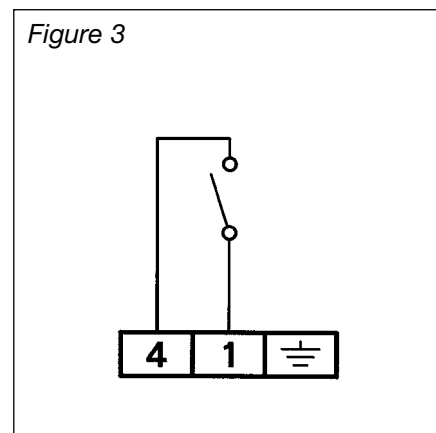
Description of the wiring diagram

Figure 2:

- contact closed
- circuit closed

Figure 3:

- contact open
- circuit open



Definition of the contact type

MK = magnetic spring contact

SK = sliding contact

EK = electronic contact

IK = inductive contact

Depending on the type of the pressure gauge, up to four contacts can be fitted to one gauge.

The number of switching contacts is indicated by a figure (1 - 4) after the contact type designation.

Example:

MK 2.12

- Magnetic spring contact
- 2 contacts
- 1st contact closes
- 2nd contact opens

Definition of complete gauge

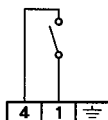
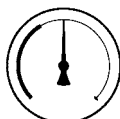
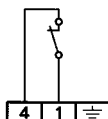
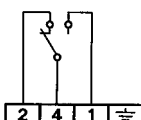
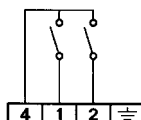
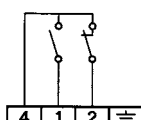
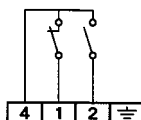
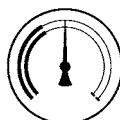
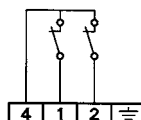
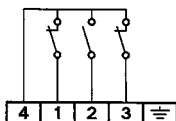
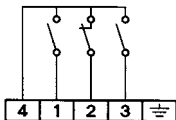
The code for the contact is added to the type designation of the gauge.

Example:

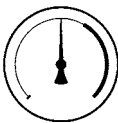
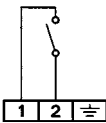
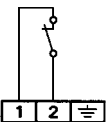
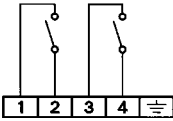
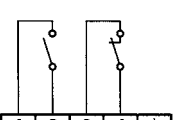
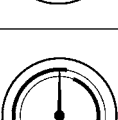
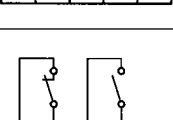
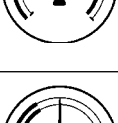
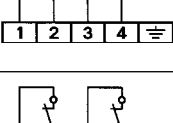
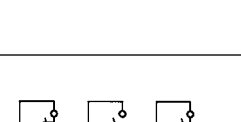
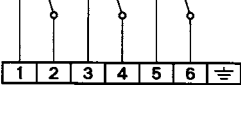
RF100Ch IK1.2

- Bourdon tube pressure gauge
- NG 100
- Gauge for chemical applications
- Inductive contact
- One contact
- Contact opens

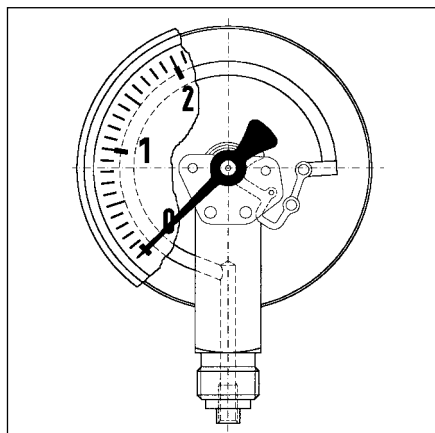
Switching functions of electrical contacts (electromechanical)

Switching scheme	Wiring diagram	Switching function (pointer moves in clockwise direction)	Contact type	
			Magnetic spring contact	Sliding contact
Single contact				
		Contact closes	MK1.1	SK1.1
		Contact opens	MK1.2	SK1.2
		Contact switches over, i.e 1 contact opens 1 contact closes	MK1.W	SK1.W
Double contact				
		1 st contact closes 2 nd contact closes	MK2.11	SK2.11
		1 st contact closes 2 nd contact opens	MK2.12	SK2.12
		1 st contact opens 2 nd contact closes	MK2.21	SK2.21
		1 st contact opens 2 nd contact opens	MK2.22	SK2.22
Triple contact				
		1 st contact opens 2 nd contact closes 3 rd contact opens	MK3.212	SK3.212
		1 st contact closes 2 nd contact opens 3 rd contact closes	MK3.121	SK3.121

Switching functions of electrical contacts (inductive)

Switching scheme	Wiring diagram	Switching function	The clockwise rotation of the pointer of the gauge moves the control flag...	Contact type
		Pointer moves clockwise		Inductive contact
Single contact				
		Contact closes	outside the switch contact head area	IK1.1
		Contact opens	inside the switch contact head area	IK1.2
Double contact				
		1 st contact closes 2 nd contact closes	the 1 st and 2 nd contact outside the switch contact head	IK2.11
		1 st contact closes 2 nd contact opens	the 1 st contact outside the switch contact head the 2 nd contact inside the switch contact head	IK2.12
		1 st contact opens 2 nd contact closes	the 1 st contact inside the switch contact head the 2 nd contact outside the switch contact head	IK2.21
		1 st contact opens 2 nd contact opens	the 1 st and 2 nd contact inside the switch contact head	IK2.22
Triple contact				
		1 st contact opens 2 nd contact closes 3 rd contact opens	the 1 st and 3 rd contact inside the switch contact head the 2 nd contact outside the switch contact head	IK3.212
		1 st contact closes 2 nd contact opens 3 rd contact closes	the 1 st and 3 rd contact outside the switch contact head the 2 nd contact inside the switch contact head	IK3.121

Bourdon tube pressure gauges with electrical contacts, nominal size 50



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. For measurement in areas with limited space. Especially suitable for monitoring minimum pressure in gas cylinders together with AFRISO alarm unit for low gas level (refer to page 353).

Type

D 9

Nominal size

50

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/+1.5 to -1/+15 bar
0/2.5 to 0/400 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Contact types

Sliding contact (SK)

Minimum measuring ranges

Contact

SK single

2.5 bar

SK change-over contact 16 bar
(up to 60 bar max.)

Switching point

Exact details of the switching point are required to ensure optimum operation.

Operating temperature range

Medium: $T_{max} = +150\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

percentage of full scale value

Protection

IP 42 (EN 60529)

Standard version

Connection

Stainless steel 1.4571, bottom
G $\frac{1}{4}$ B - spanner size 14
(EN 837-1/7.3)

Electrical connection

Cable gland, 2 m cable

Measuring element

Bourdon tube, stainless steel 1.4571
 $\leq 60\text{ bar}$ „C“ type bourdon tube
 $> 60\text{ bar}$ helical tube

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with rear
blow-out according to EN 562

Crimped bezel

Stainless steel 1.4301

Contact cover

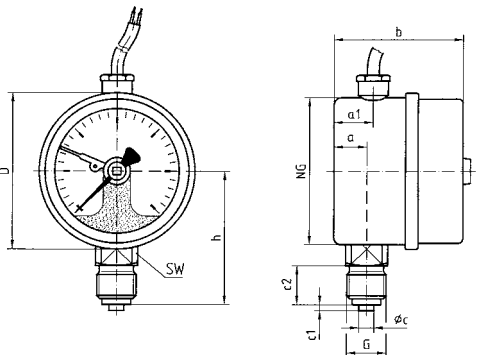
Makrolon, with contact adjustment
lock

Options

- Wetted parts oil and grease free
- Damping screw

Bourdon tube pressure gauges with electrical contacts, nominal size 50 Type D 9

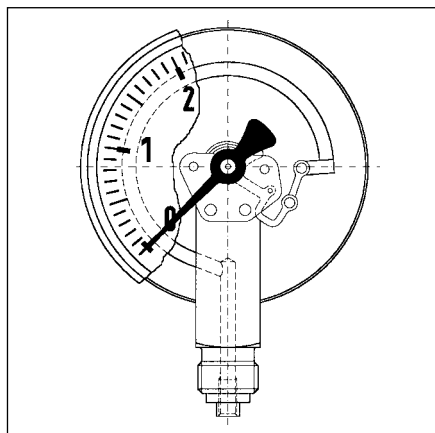
Housing types and dimensions

<i>Bottom connection</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	Øc	c1	c2	D	G	h	SW					
50	10.5	13	43	5	2	13	53	G1/4B	46	14					

Bourdon tube pressure gauges with electrical contacts, nominal size 63



Application

For aggressive gaseous and liquid media which are not highly viscous and do not crystallize. For measurement in areas with limited space. Especially suitable for monitoring minimum pressure in gas cylinders together with AFRISO alarm unit for low gas level (refer to page 353).

Type

D 3

Nominal size

63

Accuracy class (EN 837-1/6)

1.6

Ranges (EN 837-1/5)

-1/+0.6 to -1/+15 bar
1/1.6 to 0/600 bar

Application area

Static load:

$\frac{3}{4}$ x full scale value

Dynamic load:

$\frac{2}{3}$ x full scale value

Short term:

full scale value

Contact types

Magnetic spring contact (MK)

Electronic contact (EK)

Inductive contact (IK)

Refer to pages 334-336 for technical specifications

Minimum measuring ranges

Contact

MK single 1.6 bar

MK double 1.6 bar

EK/IK single 1.6 bar

EK/IK double 1.6 bar

Operating temperature range

Medium: $T_{max} = +150\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$
percentage of full scale value

Protection

IP 42 (EN 60529)

Standard version

Connection

Stainless steel 1.4571, bottom or bottom back

G $\frac{1}{4}$ B - spanner size 14
(EN 837-1/7.3)

Electrical connection

Cable gland M 12 x 1.5

1 m cable

Measuring element

Bourdon tube, stainless steel

1.4571

$\leq 60\text{ bar}$ „C“ type bourdon tube

$> 60\text{ bar}$ helical tube

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with rear blow-out

Push on bezel

Stainless steel 1.4301

Front glass

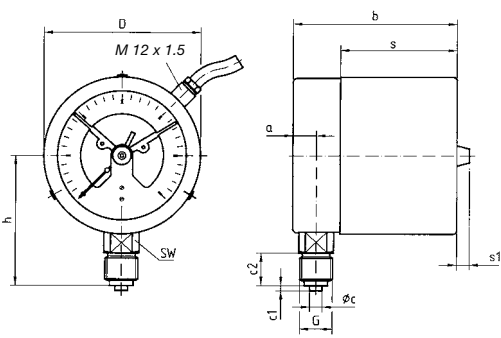
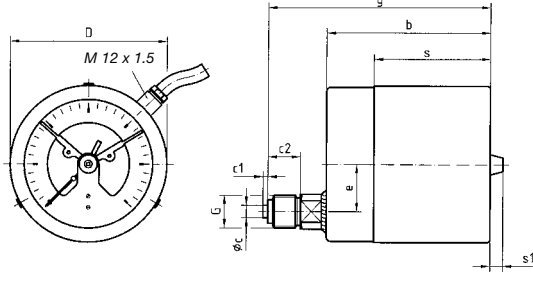
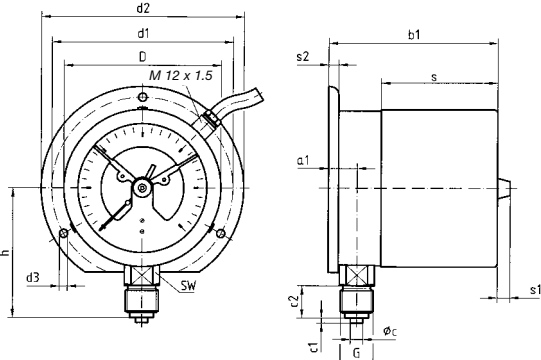
Makrolon, with contact adjustment lock

Options

- Wetted parts oil and grease free ($\leq 0/400\text{ bar}$)
- Ultra-pure gas version
- Back flange
- Damping screw

Bourdon tube pressure gauges with electrical contacts, nominal size 63 Type D 3

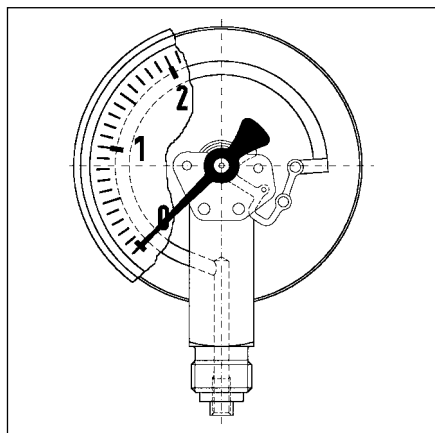
Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom back connection</i> 
<i>Bottom connection, back flange</i> 	

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	D	g	G	h	s	s1	s2	SW
63	9.5	13	66	69.5	5	2	13	64	89	G1/4B	46	47.5	8	5.5	14

Bourdon tube pressure gauges with electrical contacts for industrial applications



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys. For high accuracy measurement.

Type

D 2

Nominal size

100

Accuracy class (EN 837-1/6)

Class 1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
0/1 to 0/1,000 bar

Application area

Static load:

$\leq 600 \text{ bar} = \text{full scale value}$
 $> 600 \text{ bar} = \frac{3}{4} \times \text{full scale value}$

Dynamic load:

$\leq 600 \text{ bar} = 0.9 \times \text{full scale value}$
 $> 600 \text{ bar} = \frac{2}{3} \times \text{full scale value}$

Short term:

$\leq 600 \text{ bar} = 1.3 \times \text{full scale value}$
 $> 600 \text{ bar} = \text{full scale value}$

Contact types

Magnetic spring contact (MK)

Electronic contact (EK)

Inductive contact (IK)

Refer to pages 334-336 for technical specifications

Minimum measuring ranges

Contact

MK single 1.6 bar

MK double 1.6 bar

EK/IK single 1 bar

EK/IK double 1 bar

Operating temperature range

Medium: $T_{\max} = +60 \text{ }^{\circ}\text{C}$

Ambient: $T_{\min} = -20 \text{ }^{\circ}\text{C}$

$T_{\max} = +60 \text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20 \text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4 \text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4 \text{ } \%/10\text{K}$
percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Brass, bottom or bottom back

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Electrical connection

Cable gland M 12 x 1.5

1 m cable

Measuring element

Bourdon tube element,
 $\leq 60 \text{ bar}$ „C“ type bourdon tube,
copper alloy
 $> 60 \text{ bar}$ helical tube, 1.4571

Movement

Brass

Dial

Aluminium, white
Dial marking black

Pointer

Aluminium, black

Housing

Sheet steel, black

Push-on bezel

Sheet steel, black

Front glass

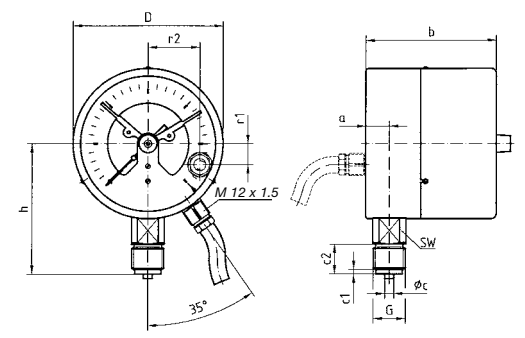
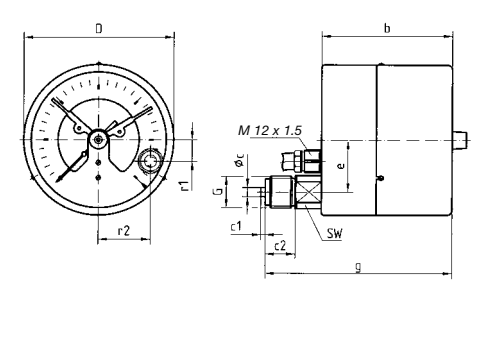
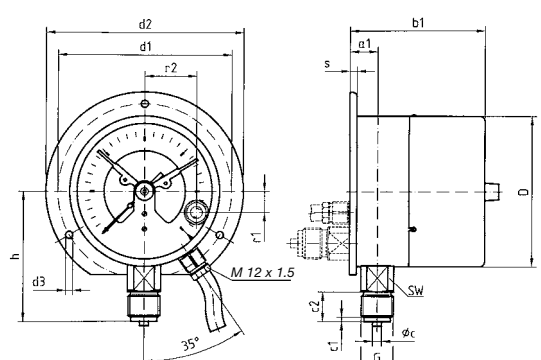
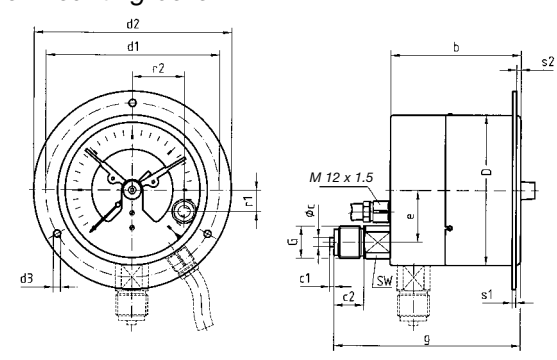
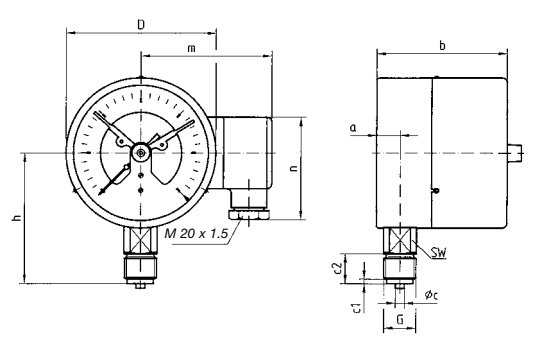
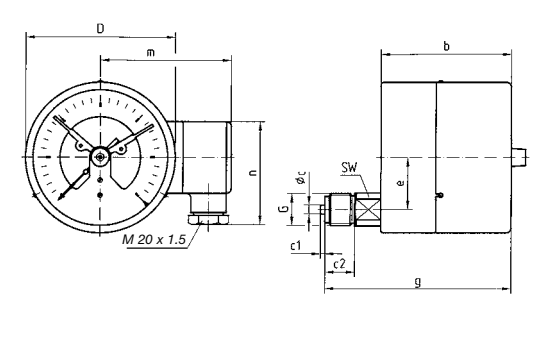
Makrolon, with contact
adjustment lock

Options

- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Junction box
- Plug-in connectors

Bourdon tube pressure gauges with electrical contacts for industrial applications Type D 2 - NG 100

Housing types and dimensions

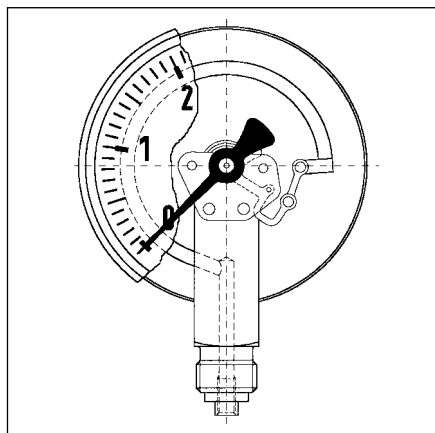
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<i>Bottom connection (back), back flange</i> 	<i>Bottom back connection (or bottom), 3-hole fixing, panel mounting bezel</i> 
<i>Bottom connection, with junction box (option)</i> 	<i>Bottom back connection, with junction box (option)</i> 

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	m	n	r1	r2	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	100.5	26.5	119	G1/2B	86	92	72	14	34.5	5.5	3
Nominal size (NG)	s2	SW																			
100	2.5	22																			

* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges with electrical contacts for industrial applications



Application

For gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys. For high accuracy measurement.

Type

D 4

Nominal size

100 - 160

Accuracy class (EN 837-1/6)

1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
0/1 to 0/1,000 bar

Application area

Static load:

$\leq 600 \text{ bar} = \text{full scale value}$
 $> 600 \text{ bar} = \frac{3}{4} \times \text{full scale value}$

Dynamic load:

$\leq 600 \text{ bar} = 0.9 \times \text{full scale value}$
 $> 600 \text{ bar} = \frac{2}{3} \times \text{full scale value}$

Short term:

$\leq 600 \text{ bar} = 1.3 \times \text{full scale value}$
 $> 600 \text{ bar} = \text{full scale value}$

Contact types

Magnetic spring contact (MK)

Electronic contact (EK)

Inductive contact (IK)

Refer to pages 334-336 for technical specifications

Minimum measuring ranges

Contact

MK single 1.6 bar

MK double 1.6 bar

EK/IK single 1 bar

EK/IK double 1 bar

Operating temperature range

Medium: $T_{\max} = +60 \text{ }^{\circ}\text{C}$

Ambient: $T_{\min} = -20 \text{ }^{\circ}\text{C}$

$T_{\max} = +60 \text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20 \text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.4 \text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4 \text{ } \%/10\text{K}$
percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Brass, bottom or bottom back

G $\frac{1}{2}$ B - spanner size 22

(EN 837-1/7.3)

Electrical connection

Cable gland M 12 x 1.5

1 m cable

Measuring element

Bourdon tube element,
 $\leq 60 \text{ bar}$ „C“ type bourdon tube,
copper alloy
 $> 60 \text{ bar}$ helical tube, 1.4571

Movement

Brass

Dial

Aluminium, white
Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

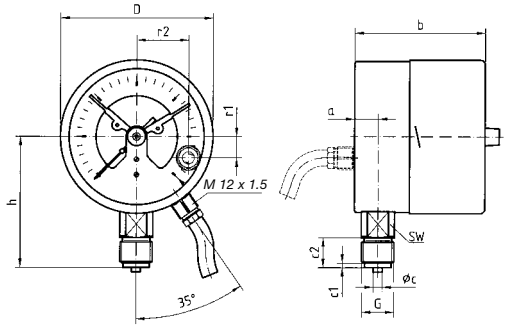
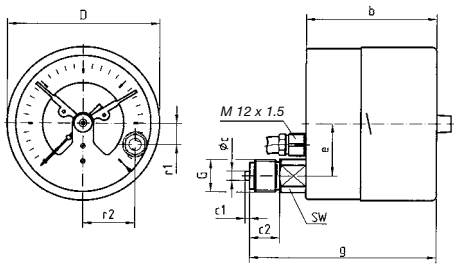
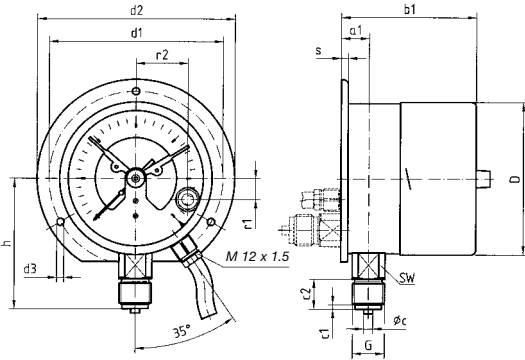
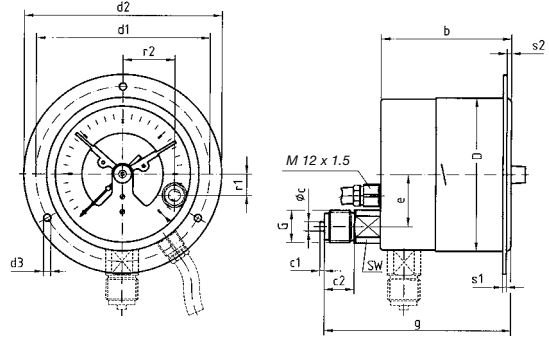
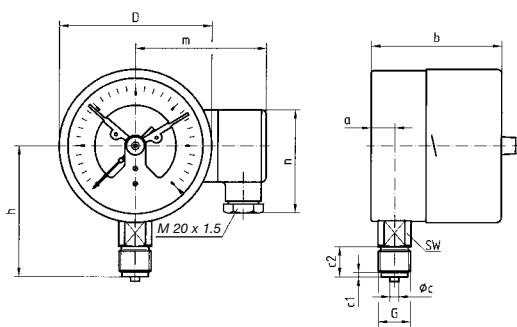
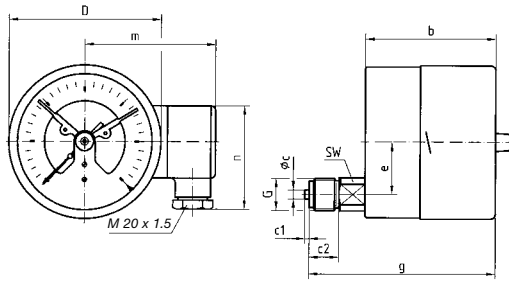
Makrolon, with contact
adjustment lock

Options

- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Junction box
- Plug-in connectors

Bourdon tube pressure gauges with electrical contacts for industrial applications Type D 4 - NG 100/160

Housing types and dimensions

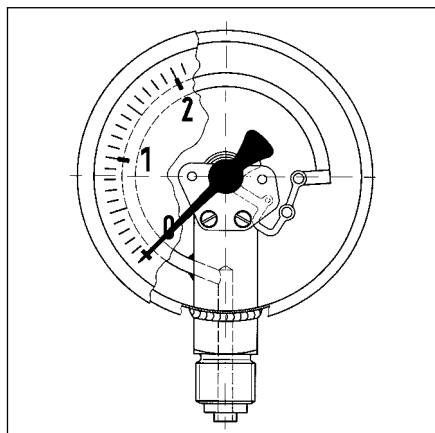
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<i>Bottom connection (or bottom back), back flange</i> 	<i>Bottom back connection (or bottom), 3-hole fixing, panel mounting bezel</i> 
<i>Bottom connection, with junction box (option)</i> 	<i>Bottom back connection, with junction box (option)</i> 

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	m	n	r1	r2	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	26.5	119	G1/2B	86	92	72	14	34.5	5.5	2
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	26.5	129	G1/2B	116	122	72	14	34.5	6	2
Nominal size (NG)	s2	SW																			
100	4	22																			
160	4	22																			

* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges with electrical contacts for chemical applications



Application

For corrosive, gaseous and liquid media which are not highly viscous and do not crystallize. Suitable for use in corrosive atmospheres. For high accuracy measurement.

Type

D 4

Nominal size

100 - 160

Accuracy class (EN 837-1/6)

1.0

Ranges (EN 837-1/5)

-1/0 to -1/+15 bar
0/1 to 0/1,000 bar

Application area

Static load:

≤ 600 bar = full scale value
> 600 bar = $\frac{3}{4}$ x full scale value

Dynamic load:

≤ 600 bar = 0.9 x full scale value
> 600 bar = $\frac{2}{3}$ x full scale value

Short term:

≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Contact types

Magnetic spring contact (MK)

Electronic contact (EK)

Inductive contact (IK)

Refer to pages 334-336 for technical specifications

Minimum measuring ranges

Contact

MK single 1.6 bar

MK double 1.6 bar

EK/IK single 1 bar

EK/IK double 1 bar

Operating temperature range

Medium: $T_{max} = +150\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.4\text{ } \%/10\text{K}$
percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Stainless steel, bottom or bottom back

G $\frac{1}{2}$ B- spanner size 22
(EN 837-1/7.3)

Electrical connection

Junction box

Measuring element

Bourdon tube, stainless steel

1.4571

≤ 60 bar „C“ type bourdon tube

> 60 bar helical tube

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with pressure relief port

Bayonet type bezel

Stainless steel 1.4301

Front glass

Makrolon, with contact adjustment lock

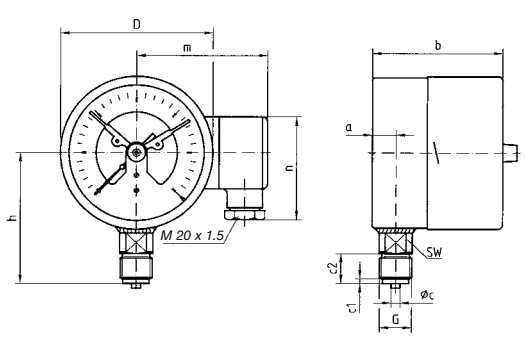
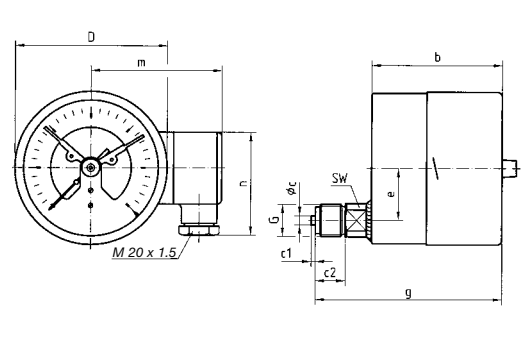
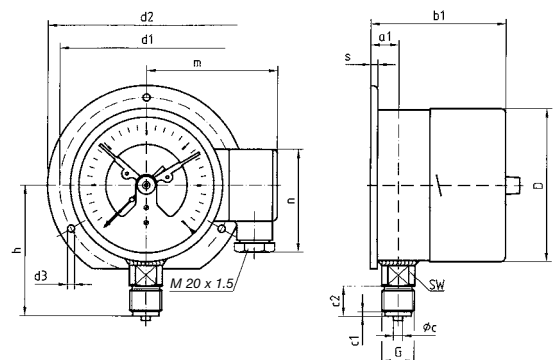
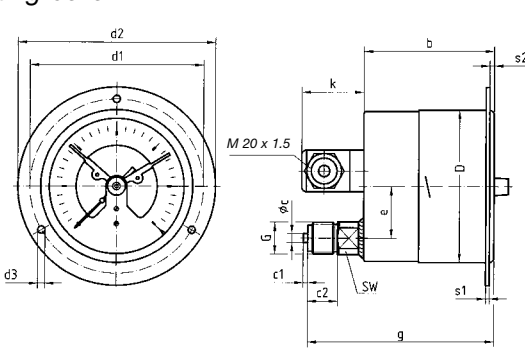
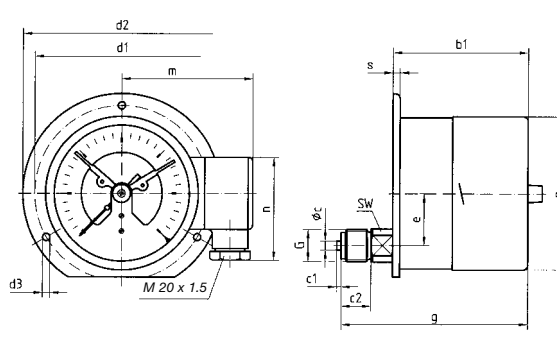
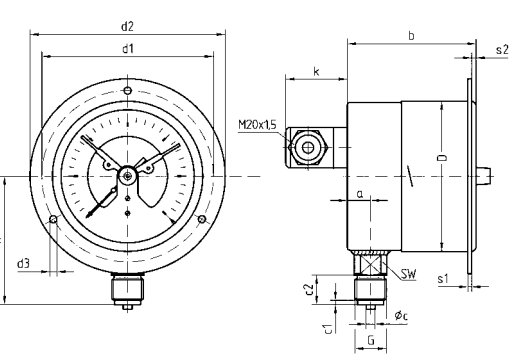
Options

- Liquid filling (silicone oil)
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Plug-in connectors

Bourdon tube pressure gauges with electrical contacts for chemical applications

Type D 4 - NG 100/160

Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom back connection</i> 
<i>Bottom connection, back flange</i> 	<i>Bottom back connection, 3-hole fixing, panel mounting bezel</i> 
<i>Bottom back connection, back flange</i> 	<i>Bottom connection, 3-hole fixing, panel mounting bezel</i> 

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	k	m	n	s	s1	s2
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	34.5	121	G1/2B	86	40	92	72	5.5	2	4
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	34.5	131	G1/2B	116	40	122	72	6	2	4
Nominal size (NG)	SW																				
100	22																				
160	22																				

* Dimensions according to DIN EN 837-1

Bourdon tube pressure gauges with electrical contacts

DG: M

Type	RF50SK1, D902	RF50SKW, D902	RF63MK1, D302	RF63MK2, D302	RF63IK1, D302	RF63IK2, D302	RF100IMK1, D201	RF100IMK2, D201
Version								
Housing Ø	50	50	63	63	63	63	100	100
Housing	Stainless steel 1.4301 with crimped bezel		Stainless steel 1.4301 with push-on bezel				Sheet steel, black, with push-on bezel	
Meas. elem.	Bourdon tube, stainless steel 1.4571						Copper alloy	
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.0	1.0
Connection	G1/4B	G1/4B	G1/4B	G1/4B	G1/4B	G1/4B	G1/2B	G1/2B
Contact type	Sliding single	Sliding change-over	Magnetic spring single	Magnetic spring double	Inductive single	Inductive double	Magnetic spring single	Magnetic spring double
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	---	---	---	---	---	---	---	---
-1/+0.6	---	---	87402302	87502302	87452302	87552302	87602201	87652201
-1/+1.5	87430902	---	87403302	87503302	87453302	87553302	87603201	87653201
-1/+3	87431902	---	87404302	87504302	87454302	87554302	87604201	87654201
-1/+5	87432902	---	87405302	87505302	87455302	87555302	87605201	87655201
-1/+9	87433902	---	87406302	87506302	87456302	87556302	87606201	87656201
-1/+15	87434902	87480902	87407302	87507302	87457302	87557302	87607201	87657201
Price €								
0/0.6	---	---	---	---	---	---	---	---
0/1	---	---	---	---	---	---	---	---
0/1.6	---	---	87411302	87511302	87461302	87561302	87611201	87661201
0/2.5	87435902	---	87412302	87512302	87462302	87562302	87612201	87662201
0/4	87436902	---	87413302	87513302	87463302	87563302	87613201	87663201
0/6	87437902	---	87414302	87514302	87464302	87564302	87614201	87664201
0/10	87438902	---	87415302	87515302	87465302	87565302	87615201	87665201
0/16	87439902	87481902	87416302	87516302	87466302	87566302	87616201	87666201
0/25	87440902	87482902	87417302	87517302	87467302	87567302	87617201	87667201
0/40	87441902	87483902	87418302	87518302	87468302	87568302	87618201	87668201
Price €								
0/60	87442902	87484902	87419302	87519302	87469302	87569302	87619201	87669201
0/100	87443902	---	87420302	87520302	87470302	87570302	87620201	87670201
0/160	87444902	---	87421302	87521302	87471302	87571302	87621201	87671201
0/250	87445902	---	87422302	87522302	87472302	87572302	87622201	87672201
0/400	87446902	---	87423302	87523302	87473302	87573302	87623201	87673201
Price €								
0/600	---	---	87424302	87524302	87474302	87574302	87624201	87674201
0/1000	---	---	---	---	---	---	87625201	87675201

Please specify required switching function (normally closed/normally open). Refer to page 351/352 for other versions.

Bourdon tube pressure gauges with electrical contacts

DG: M

Type	RF100I MK1, D401	RF100I MK2, D401	RF100I IK1, D401	RF100I IK2, D401	RF100Ch MK1, D402	RF100Ch MK2, D402	RF100Ch IK1, D402	RF100Ch IK2, D402
Version								
Housing Ø	100	100	100	100	100	100	100	100
Housing	Stainless steel 1.4301 with bayonet type bezel							
Meas. elem.	Bourdon tube, copper alloy				Bourdon tube, stainless steel 1.4571			
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B
Contact type	Magnetic spring single	Magnetic spring double	Inductive single	Inductive double	Magnetic spring single	Magnetic spring double	Inductive single	Inductive double
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	---	---	87701401	87751401	---	---	87701402	87751402
-1/+0.6	87602401	87652401	87702401	87752401	87602402	87652402	87702402	87752402
-1/+1.5	87603401	87653401	87703401	87753401	87603402	87653402	87703402	87753402
-1/+3	87604401	87654401	87704401	87754401	87604402	87654402	87704402	87754402
-1/+5	87605401	87655401	87705401	87755401	87605402	87655402	87705402	87755402
-1/+9	87606401	87656401	87706401	87756401	87606402	87656402	87706402	87756402
-1/+15	87607401	87657401	87707401	87757401	87607402	87657402	87707402	87757402
Price €								
0/0.6	---	---	87709401	87759401	---	---	87709402	87759402
0/1	---	---	87710401	87760401	---	---	87710402	87760402
0/1.6	87611401	87661401	87711401	87761401	87611402	87661402	87711402	87761402
0/2.5	87612401	87662401	87712401	87762401	87612402	87662402	87712402	87762402
0/4	87613401	87663401	87713401	87763401	87613402	87663402	87713402	87763402
0/6	87614401	87664401	87714401	87764401	87614402	87664402	87714402	87764402
0/10	87615401	87665401	87715401	87765401	87615402	87665402	87715402	87765402
0/16	87616401	87666401	87716401	87766401	87616402	87666402	87716402	87766402
0/25	87617401	87667401	87717401	87767401	87617402	87667402	87717402	87767402
0/40	87618401	87668401	87718401	87768401	87618402	87668402	87718402	87768402
Price €								
0/60	87619401	87669401	87719401	87769401	87619402	87669402	87719402	87769402
0/100	87620401	87670401	87720401	87770401	87620402	87670402	87720402	87770402
0/160	87621401	87671401	87721401	87771401	87621402	87671402	87721402	87771402
0/250	87622401	87672401	87722401	87772401	87622402	87672402	87722402	87772402
0/400	87623401	87673401	87723401	87773401	87623402	87673402	87723402	87773402
Price €								
0/600	87624401	87674401	87724401	87774401	87624402	87674402	87724402	87774402
0/1000	87625401	87675401	87725401	87775401	87625402	87675402	87725402	87775402

Please specify required switching function (normally closed/normally open). Refer to page 350/352 for other versions.

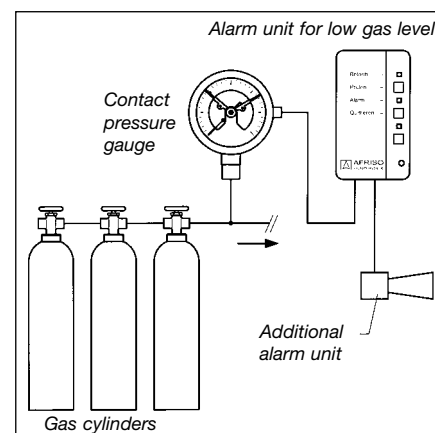
Additional costs for electrical contacts

DG: M

Design			Magnetic spring contact			Inductive contact		
Code			MK 1	MK 2	MK 3	IK 1	IK 2	IK 3
Number of contacts			1	2	3	1	2	3
Switching function: 1 = closes, 2 = opens (pointer moves clockwise)			1 2	11 , 12 21 , 22	as specified	1 2	11 , 12 21 , 22	as specified
The additional costs include fitting of contacts; gauge not included								
Version	Nominal size	Housing	Price €	Price €	Price €	Price €	Price €	Price €
Bourdon tube pressure gauges for industrial applications type D2	100	without filling						
Bourdon tube pressure gauges for industrial applications type D4	100	without filling						
Pressure gauges for chemical applications type D4/D8	160	without filling						
Safety pressure gauges type D4/D8	100	with filling						
Stainless steel diaphragm pressure gauges type D4/D8	160	with filling						
Standard diaphragm pressure gauges type D4/D8	100	without filling						
	160	without filling						
Bourdon tube pressure gauges for high pressures type D4/D8	100	with filling						
	160	with filling						
Diaphragm pressure gauges for chemical applications type D4/D8	100	without filling						
	160	without filling						
Diaphragm pressure gauges for differential pressure type D4/D8	100	with filling						
	160	with filling						
Additional costs for special versions			NG 100			NG 160		
Electronic contact with 3-wire slot initiator (additional cost over and above magnetic spring contact)	1 contact (EK 1) 2 contacts (EK 2) 3 contacts (EK 3)							
Separate circuits for double magnetic spring contacts								
Separate circuits for triple magnetic spring contacts								
Cable NYLHY (in excess of 1 metre) per metre	up to 4 wires 5 wires/7 wires							
Junction box	for instruments without filling							
Additional cable for junction box, 1 m long								
Single changeover (additional cost to single magnetic spring contact)								
Double changeover (additional cost to double magnetic spring contact)								
Contact pins from special materials (per contact)	gold/silver platinum/iridium							
Inductive contact, safety version (per contact) (can only be used in conjunction with KHA6-SH-Ex1!)	Type IK SN Type IK S1N (NG 100 only 1 contact possible)							

Versions with four electrical contacts on request.

Alarm unit for low gas level



Application

For monitoring the pressure in gas filled containers (e.g. gas installations, gas cylinder batteries or bundle stations).

Function

The alarm signal is generated by a pressure gauge fitted with an electrical contact. The alarm level can be set to any value from 5 to 95 % via the contact arm of the pressure gauge.

A green LED indicates normal operation.

In case of a power failure, the unit does not generate an alarm signal. When power is restored, the instrument immediately resumes operation. If, in the meantime, the gas pressure has fallen below the set limit, an alarm signal is generated.

When an alarm occurs, the red LED lights up. In addition, the system generates an audible alarm. The audible alarm can be re-set. The red LED remains lit for as long as the alarm condition prevails.

The proper functioning of the system can be checked at all times by pressing the test button. When the button is pressed, the system must generate an alarm, i.e. the red LED must light up and the audible alarm must sound.

Description

The system consists of one or several contact pressure gauges (connected in series), a control unit (alarm unit for low gas level) and, if required, an additional alarm unit.

The contact pressure gauge is equipped with a magnetic spring contact which is actuated by the pointer of the pressure gauge. The ranges of the pressure gauges can be selected as required.

If several gas containers are to be monitored, several contact pressure gauges can be connected in series and monitored by a single alarm unit for low gas level. It is also possible to connect a separate alarm unit for each measuring point.

An additional alarm unit can be connected to the relay output of the alarm unit as an auxiliary remote alarm.

Technical specifications

Operating temperature range

Ambient: -5 °C/+40 °C

Supply voltage

AC 230 V $\pm$ 10 %

Power consumption

5 VA

Circuit to pressure gauge

Intrinsically safe, $U < 16.8 \text{ V}$, $I < 57 \text{ mA}$

Relay output

Relay contact: 1 voltage-free contact, normally open
Contact rating: Max. 250 V, 2 A, (resistive load)

Response delay

none

Intrinsic safety

[EEx ia] IIC

Housing

Wall mounting housing made from impact resistant plastic (ABS)
W x H x D: 97 x 163 x 62 mm

Protection

IP 30 (EN 60529)

Protection class

II (EN 60730)

Interference

According to EN 61000-6-3

Noise immunity

According to EN 61000-6-2

	DG	Part no.	Price €
Alarm unit for low gas level	M	67006	
Mounting frame for panel mounting	G	43520	

Contact protection relay/isolating switching amplifier for electrical contacts



Application and principle of operation of the contact protection relays MSR/MSR-I

The application of a pulsed voltage to the contacts (e.g. of a contact pressure gauge) ensures load free switching of the contacts (99 % voltage-free). This protects the contacts and prolongs their service life. When used for measuring instruments with liquid filling it prevents turbidity of the liquid and protects the contact surfaces.

Supply voltage

AC 230 V, 50-60 Hz
Power consumption approx. 6 VA

Control voltage

MSR DC 35-40 V Pulse
MSR-I DC 10 V

Relay output

Voltage-free changeover contact
Switch rating 250 V/8 A max.

Voltage output

DC 24 V, 20 mA max.

Housing

Polyamide, 6.6
DIN rail mounting, 35 x 7.5
according to DIN 50022

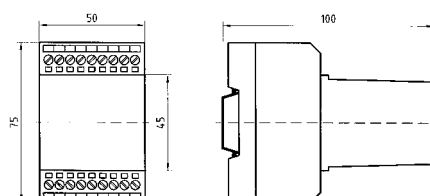
Protection

IP 20 according to IEC 529

Operating temperature range

0/70 °C

Dimensions



Application and principle of operation of the KFA isolating switching amplifier

Isolating switching amplifiers are used to isolate an intrinsically safe control circuit from a non-intrinsically safe operating current circuit. They are required to operate measuring instruments with electrical contacts in hazardous areas (zones 0, 1 and 2). The isolating switching amplifier must always be installed outside of the hazardous area!

Supply voltage

AC 230 V, 50-60 Hz

Open circuit voltage/short circuit current

Standard version
approx. DC 8 V/8 mA
Safety version
approx. DC 8.4 V/11.7 mA

Relay output

(not intrinsically safe)

Voltage-free changeover contact
Standard version
AC 250 V/2 A (40 V)/2 A
Safety version
AC 50 V (DC 24 V)/1 A

Hazardous area classification

[Ex ib] IIC + [Ex ia] IIC

Housing

Makrolon
DIN rail mounting 35 x 7.5
according to DIN 50022

Protection

IP 20 according to IEC 529

Operating temperature range

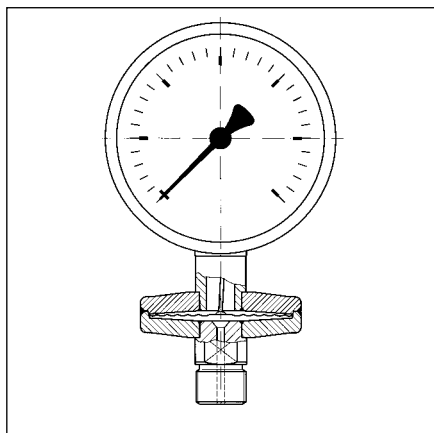
-20/+60 °C

DG: H

Version	Part no.	Price €
MSR 010 1 contact	38201	
MSR 020 2 contacts	38202	
MSR 011 Interval	38203	
MSR 010-I 1 contact	38204	
MSR 020-I 2 contacts	38205	
MSR 011-I Interval	38206	
KFA6-SR2-Ex1.W	38215	
KFA6-SR2-Ex2.W	38216	
KHA6-SH-Ex1 1 contact, for fail-safe mode	38217	

Please enquire for complete data sheets on the individual units.

Stainless steel diaphragm pressure gauges EN 837-3



Application

For corrosive, gaseous and liquid media, also suitable for use in corrosive atmospheres. Also suitable for viscous and polluted media in conjunction with open connection flange. With clamp connection especially suitable for hygienic processes.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

100 - 160

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

0/40 mbar to 0/25 bar

Application area

Static load:

full scale value

Dynamic load:

0.9 x full scale value

Overpressure safety

1.3 x full scale value

Operating temperature range

Medium: $T_{max} = +100\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.8\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.8\text{ } \%/10\text{K}$

percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Stainless steel 1.4571, bottom

G $\frac{1}{2}$ B - spanner size 22

(EN 837-3/7.3)

Lower flange

Stainless steel 1.4571

Upper flange

Stainless steel 1.4571

Measuring element

Diaphragm:

40 mbar to 2.5 bar

stainless steel 1.4571

4 bar to 25 bar Duratherm

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

Options

- Glycerine filling
- Wetted parts with special coating
- Clamp connection
- Flush mounting connection flanges according to EN
- Open connection flanges according to EN/ANSI
- Other connection threads
- Electrical contacts ($\geq 0/0.6\text{ bar}$)

Stainless steel diaphragm pressure gauges

Type D 4 - NG 100/160

Housing types and dimensions (in mm)

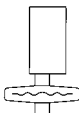
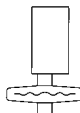
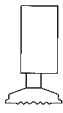
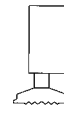
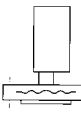
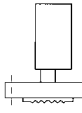
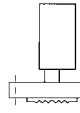
Bottom connection, 0/40 mbar to 0/2.5 bar	Bottom connection, 0/4 bar to 0/25 bar
Clamp connection 2" according to ISO 2852, 0/1 bar to 0/6 bar	Connection flange according to EN 1092-1/B 1/DN 25/PN 40 Open, 0/40 mbar to 0/25 bar Flush mounting, 0/1 bar to 0/6 bar
Flush mounting connection flange according to EN 1092-1/B 1/DN 50/PN 40, 0/40 mbar to 0/25 bar	Flush mounting connection flange according to EN 1092-1/B 1/DN 80/PN 40, 0/40 mbar to 0/25 bar

Dimensions (mm)

Nominal size (NG)	a	b	c	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	dm	dm1	D	D1	D2	DN
100	15.6	49	20	68	85	115	4xØ18	102	125	165	8xØ18	138	160	200	48	68	69	78	64	25
160	17.5	50	20	68	85	115	4xØ18	102	125	165	8xØ18	138	160	200	48	68	69	78	64	25
Nominal size (NG)	G	G1	h	h1	h2	h3	h4	h5	h6	s	s1	s2	s3	s4	s5	SW				
100	G1/2B	4xM12	117	117	86	102	96	86	90	2	30	3	20	3	24	22				
160	G1/2B	4xM12	148	148	117	133	127	117	121	2	30	3	20	3	24	22				

Stainless steel diaphragm pressure gauges EN 837-3

DG: H

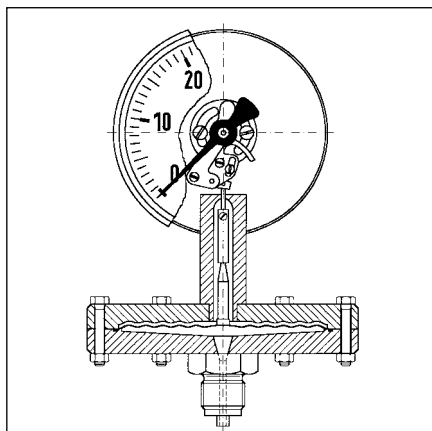
Type	PF100E, D402	PF160E, D402	PF100CP, D402	PF160CP, D402	PF100E, D402	PF160E, D402	PF100E, D402	PF160E, D402
Version								
Housing Ø	100	160	100	160	100	160	100	160
Housing	Stainless steel 1.4301 with bayonet type bezel							
Meas. elem.	1.4571, ≥ 4 bar Duratherm		Stainless steel 1.4571		Stainless steel 1.4571, ≥ 4 bar Duratherm			
Flanges	Stainless steel 1.4571							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G ¹ / ₂ B	G ¹ / ₂ B	Clamp 2“ ISO 2852	Clamp 2“ ISO 2852	Open connection flange according to EN 1092-1/ B 1/DN 25/PN 40		Flush mounting connection flange according to EN 1092-1/ B 1/DN 50/PN 40	
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
0/10	---	---	---	---	---	---	---	---
0/16	---	---	---	---	---	---	---	---
0/25	---	---	---	---	---	---	---	---
0/40	85884402	85924402	---	---	88904402	88924402	88944402	88964402
0/60	85885402	85925402	---	---	88905402	88925402	88945402	88965402
0/100	85886402	85926402	---	---	88906402	88926402	88946402	88966402
0/160	85887402	85927402	---	---	88907402	88927402	88947402	88967402
0/250	85888402	85928402	---	---	88908402	88928402	88948402	88968402
0/400	85889402	85929402	---	---	88909402	88929402	88949402	88969402
Range (bar)								
Price €								
0/0.6	85890402	85930402	---	---	88910402	88930402	88950402	88970402
0/1	85891402	85931402	88980402	88990402	88911402	88931402	88951402	88971402
0/1.6	85892402	85932402	88981402	88991402	88912402	88932402	88952402	88972402
0/2.5	85893402	85933402	88982402	88992402	88913402	88933402	88953402	88973402
Price €								
0/4	85894402	85934402	88983402	88993402	88914402	88934402	88954402	88974402
0/6	85895402	85935402	88984402	88994402	88915402	88935402	88955402	88975402
0/10	85896402	85936402	---	---	88916402	88936402	88956402	88976402
0/16	85897402	85937402	---	---	88917402	88937402	88957402	88977402
0/25	85898402	85938402	---	---	88918402	88938402	88958402	88978402

Additional costs for stainless steel diaphragm pressure gauges

DG: H

Process connection			Price €
Groove/tongue according to EN 1092-1			
Connection G ¹ / ₄ B			
Connection ¹ / ₄ NPT			
Connection ¹ / ₂ NPT			
Connection M 20 x 1.5			
Other connection threads			on request
Channel bore Ø 10 mm in connection G ¹ / ₂ B			Standard
Flush mounting connection flange according to DIN EN 1092-1/B1 (Additional cost over standard connection G ¹ / ₂ B)	Nominal width	Nominal pressure	Price €
	DN 25 (0/1 bar to 0/6 bar)	PN 40	
	DN 50	PN 40	
	DN 80	PN 40	
other connection flanges			on request
Special coating for diaphragm and lower flange (only for flush mounting flange)	Nominal width		Price €
PTFE coating	DN 25	PN 40	
PTFE coating	DN 50	PN 40	
PTFE coating	DN 80	PN 40	
PFA coating	DN 25	PN 40	
PFA coating	DN 50	PN 40	
PFA coating	DN 80	PN 40	
Other materials			on request
Glycerine filling			Price €
Nominal size 100			
Nominal size 160			
Miscellaneous			Price €
Overpressure safety 5 x FSD			on request
Vacuum proof (≥ 0/4 bar)			Standard
Electrical contacts (≥ 0/0.6 bar)			See page 352

Standard diaphragm pressure gauges EN 837-3



Application

For non-corrosive gaseous and liquid media. With open connecting flange also suitable for viscous and polluted media.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

100 - 160

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

0/10 to 0/250 mbar (flange Ø 160)

0/0.4 to 0/25 bar (flange Ø 100)

Application area

Static load:

full scale value

Dynamic load:

0.9 x full scale value

Overpressure safety

1.3 x full scale value

≥ 0.6 bar overpressure safety

5 x FSD, however, 40 bar max.

Operating temperature range

Medium: $T_{max} = +100\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.8\text{ ‰}/10\text{K}$

falling temp. approx. $\pm 0.8\text{ ‰}/10\text{K}$

percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Steel, bottom

G $\frac{1}{2}$ B - spanner size 22

(EN 837-3/7.3)

Lower flange

Steel

Upper flange

Stainless steel

Measuring element

Diaphragm,

Measuring flange Ø 100:

up to 1.6 bar Duratherm,

≥ 2.5 steel

Measuring flange Ø 160:

Stainless steel 1.4571

Sealing gasket to pressurised area

„Perbunan“ nitrile rubber

Movement

Brass

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

with blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

Instrument glass

Options

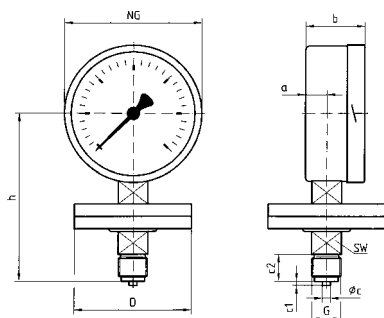
- Safety housing
- Overpressure safety 10 x FSD
flange Ø 100 up to 40 bar max.,
flange Ø 160 up to 2.5 bar max.)
- Glycerine filling (≥ 40 mbar,
< 250 mbar accuracy class 2.5)
- Wetted parts with special coating
- Open connection flanges
according to EN/ANSI

Standard diaphragm pressure gauges

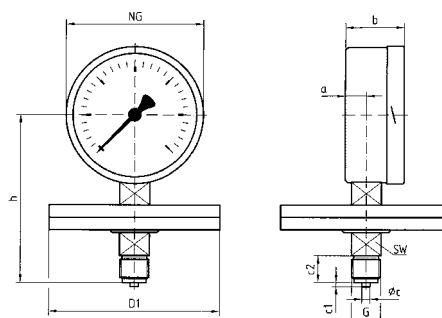
Type D 4 - NG 100/160

Housing types and dimensions

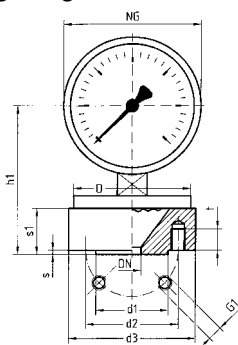
Bottom connection, measuring flange Ø 100



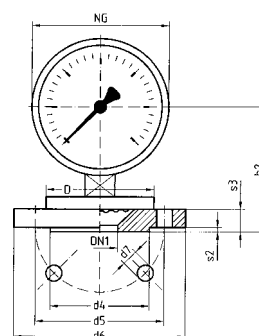
Bottom connection, measuring flange Ø 160



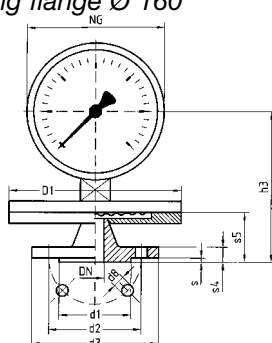
Connection flange according to EN 1092-1, DN 25 Measuring flange Ø 100



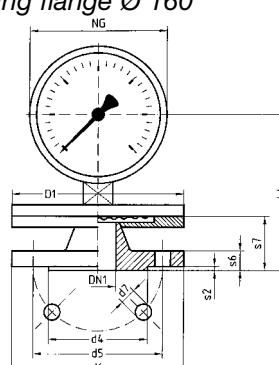
Connection flange according to EN 1092-1, DN 50 Measuring flange Ø 100



Connection flange according to EN 1092-1, DN 25 Measuring flange Ø 160



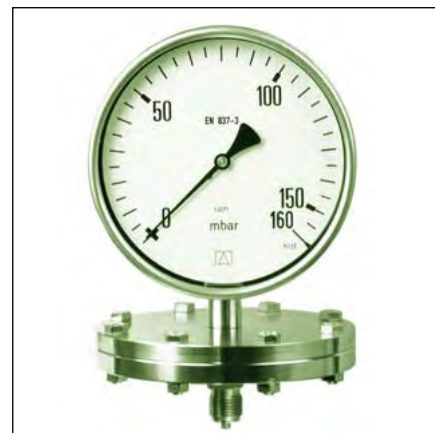
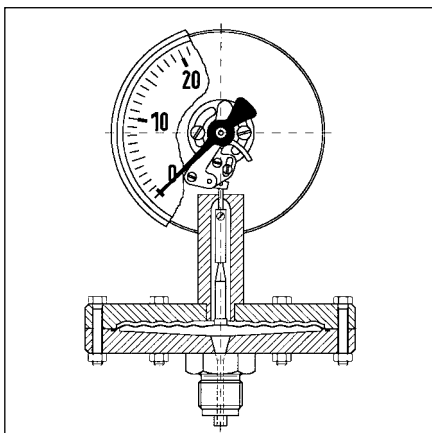
Connection flange according to EN 1092-1, DN 50 Measuring flange Ø 160



Dimensions (mm)

Nominal size (NG)	a	b	Øc	c1	c2	d1	d2	d3	d4	d5	d6	d7	d8	D	D1	DN	DN1	G	G1	h	h1
100	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G1/2B	4xM12	127	111
160	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G1/2B	4xM12	156	141
Nominal size (NG)	h2	h3	h4	s	s1	s2	s3	s4	s5	s6	s7	t	SW								
100	101	129	137	2	30	3	20	18	48	20	56	12	22								
160	131	159	167	2	30	3	20	18	48	20	56	12	22								

Diaphragm pressure gauges for chemical applications EN 837-3



Application

For corrosive, gaseous and liquid media and suitable for use in corrosive atmospheres. With open connecting flange also suitable for viscous and polluted media.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 4

Nominal size

100 - 160

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

0/10 to 0/250 mbar (flange Ø 160)
 0/0.4 to 0/25 bar (flange Ø 100)

Application area

Static load:
 full scale value
 Dynamic load:
 0.9 x full scale value

Overpressure safety

1.3 x full scale value
 ≥ 0.6 bar overpressure safety
 5 x FSD, however 40 bar max.

Operating temperature range

Medium: $T_{max} = +100\text{ }^{\circ}\text{C}$
 Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$
 $T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.8\text{ } \%/10\text{K}$
 falling temp. approx. $\pm 0.8\text{ } \%/10\text{K}$
 percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Stainless steel 1.4571, bottom
 $G\frac{1}{2}B$ - spanner size 22
 (EN 837-3/7.3)

Lower flange

Stainless steel 1.4571

Upper flange

Stainless steel 1.4301

Measuring element

Diaphragm,
 Measuring flange Ø 100:
 Duratherm
 Measuring flange Ø 160:
 Stainless steel 1.4571

Sealing gasket to pressurised area

FPM (Viton)

Movement

Stainless steel

Dial

Aluminium, white
 Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301
 with blow-out

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

Options

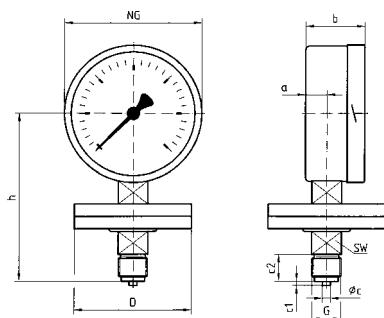
- Safety housing
- Overpressure safety 10 x FSD (flange Ø 100 up to 40 bar max., flange Ø 160 up to 2.5 bar max.)
- Glycerine filling (≥ 40 mbar, ≤ 250 mbar accuracy class 2.5)
- Wetted parts with special coating
- Open connection flanges according to EN/ANSI

Diaphragm pressure gauges for chemical applications

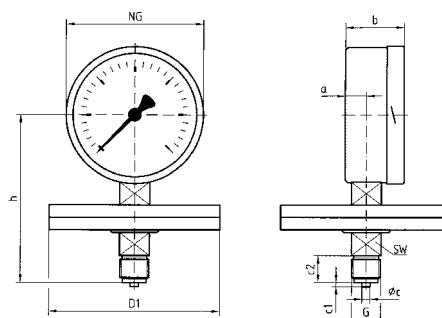
Type D 4 - NG 100/160

Housing types and dimensions

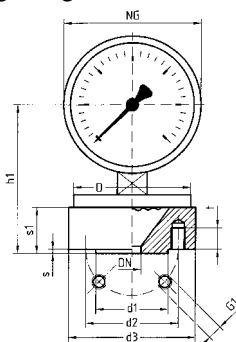
Bottom connection, measuring flange Ø 100



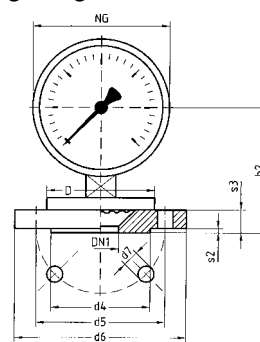
Bottom connection, measuring flange Ø 160



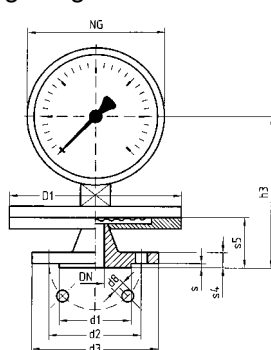
Connection flange according to EN 1092-1, DN 25 Measuring flange Ø 100



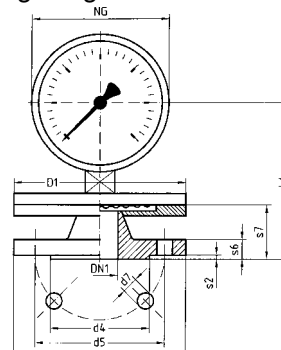
Connection flange according to EN 1092-1, DN 50 Measuring flange Ø 100



Connection flange according to EN 1092-1, DN 25 Measuring flange Ø 160



Connection flange according to EN 1092-1, DN 50 Measuring flange Ø 160



Dimensions (mm)

Nominal size (NG)	a	b	Øc	c1	c2	d1	d2	d3	d4	d5	d6	d7	d8	D	D1	DN	DN1	G	G1	h	h1
100	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G1/2B	4xM12	127	111
160	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G1/2B	4xM12	156	141
Nominal size (NG)	h2	h3	h4	s	s1	s2	s3	s4	s5	s6	s7	t	SW								
100	101	129	137	2	30	3	20	18	48	20	56	12	22								
160	131	159	167	2	30	3	20	18	48	20	56	12	22								

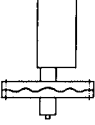
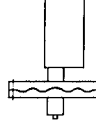
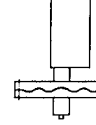
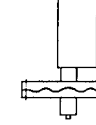
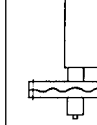
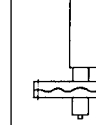
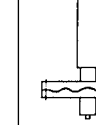
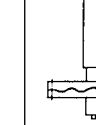
Standard diaphragm pressure gauges

Diaphragm pressure gauges for chemical applications

DG: H

with glycerine filling

with glycerine filling

Type	PF100, D401	PF160, D401	PF100Gly, D801	PF160Gly, D801	PF100Ch, D402	PF160Ch, D402	PF100CHGly, 802	PF160CHGly, 802
Version								
Housing Ø	100	160	100	160	100	160	100	160
Housing	Stainless steel 1.4301 with bayonet type bezel							
Meas. elem.	Diaphragm, refer to data sheet							
Lower flange	Steel				Stainless steel 1.4571			
Accuracy class	1.6	1.6	1.6*	1.6*	1.6	1.6	1.6*	1.6*
Connection	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
0/10	85901401	85951401	---	---	85901402	85951402	---	---
0/16	85902401	85952401	---	---	85902402	85952402	---	---
0/25	85903401	85953401	---	---	85903402	85953402	---	---
0/40	85904401	85954401	85904801	85954801	85904402	85954402	85904802	85954802
Price €								
0/60	85905401	85955401	85905801	85955801	85905402	85955402	85905802	85955802
0/100	85906401	85956401	85906801	85956801	85906402	85956402	85906802	85956802
0/160	85907401	85957401	85907801	85957801	85907402	85957402	85907802	85957802
0/250	85908401	85958401	85908801	85958801	85908402	85958402	85908802	85958802
Range (bar)								
Price €								
0/0.4	85909401	85959401	85909801	85959801	85909402	85959402	85909802	85959802
0/0.6	85910401	85960401	85910801	85960801	85910402	85960402	85910802	85960802
0/1	85911401	85961401	85911801	85961801	85911402	85961402	85911802	85961802
0/1.6	85912401	85962401	85912801	85962801	85912402	85962402	85912802	85962802
0/2.5	85913401	85963401	85913801	85963801	85913402	85963402	85913802	85963802
0/4	85914401	85964401	85914801	85964801	85914402	85964402	85914802	85964802
0/6	85915401	85965401	85915801	85965801	85915402	85965402	85915802	85965802
0/10	85916401	85966401	85916801	85966801	85916402	85966402	85916802	85966802
0/16	85917401	85967401	85917801	85967801	85917402	85967402	85917802	85967802
0/25	85918401	85968401	85918801	85968801	85918402	85968402	85918802	85968802

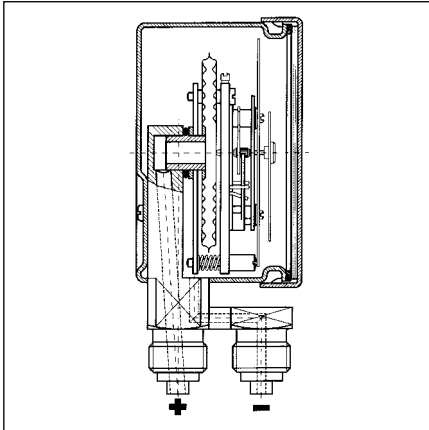
* ≤ 250 mbar class 2.5 – Refer to page 364 for additional costs.

Add. costs for standard diaphragm pressure gauges/ diaphragm pressure gauges for chemical applications

DG: H

Open connection flanges		Ranges 10 to 250 mbar Measuring flange Ø 160		Ranges 0.4 to 25 bar Measuring flange Ø 100		
	Material	Steel	Stainless steel	Steel	Stainless steel	
Version	Nominal width	Price €	Price €	Price €	Price €	
EN 1092-1, PN 40	DN 15					
	DN 20					
	DN 25					
	DN 50					
ANSI B 16.5, Class 150	DN 1½"					
	DN 1"					
	DN 2"					
Special connection	Material steel		Material stainless steel 1.4571			
	Price €		Price €			
Channel hole Ø 10 mm						
Groove/spring accor. to EN 1092-1						
RJT groove ANSI B16.5						
Special materials for diaphragms	Ranges 10 to 250 mbar Measuring flange Ø 160		Ranges 0.4 to 25 bar Measuring flange Ø 100			
	Price €		Price €			
Material						
PTFE foil (≥ 40 mbar)						
Silver foil (≥ 160 mbar)	on request					
Tantalum foil (≥ 160 mbar)						
Other materials	on request					
Special materials for lower measuring flange (wetted part) for types D402 and D802	Ranges 10 to 250 mbar Measuring flange Ø 160			Ranges 0.4 to 25 bar Measuring flange Ø 100		
	G1½B	Flange, EN 1092-1, DN 15-25 Flange ANSI 1½", 1"	Flange, EN 1092-1, DN 50 Flange ANSI 2"	G1½B	Flange, EN 1092-1 ,DN 15-25 Flange ANSI 1½", 1"	Flange, EN 1092-1, DN 50 Flange ANSI 2"
Material	Price €	Price €	Price €	Price €	Price €	Price €
PTFE lining						
Other materials	on request					
Overpressure safety 10 x FSD (Measuring flange Ø 100 up to 40 bar max., Ø 160 up to 2.5 bar max.)	Ranges 10 to 250 mbar Measuring flange Ø 160			Ranges 0.4 to 25 bar Measuring flange Ø 100		
	Price €			Price €		
Safety housing with solid baffle wall and blow-out	Housing diameter 100 mm			Housing diameter 160 mm		
	Price €			Price €		

Standard capsule type pressure gauges for differential pressure



Application

For differential pressure measurement of gaseous, dry media which are non-corrosive. Especially suitable for filter loss measurement in air conditioning and ventilation applications.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 9/D 4

Nominal size

63 - 100 - 160

Function

The „plus“ pressure (= high pressure) is applied to the inside of the diaphragm. The „minus“ pressure (= low pressure) is applied to the inside of the pressure tight housing. The pressure difference causes the diaphragm to change its shape, thus generating the movement required to measure the pressure. This displacement is picked up by the movement. The differential pressure is directly indicated by the pointer of the gauge.

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

NG 63 0/16 to 0/400 mbar
 NG 100 0/ 6 to 0/400 mbar
 NG 160 0/ 4 to 0/400 mbar

Application area

Static load:

full scale value

Dynamic load:

0.9 x full scale value

Overpressure safety

full scale value

Maximum static pressure

400 mbar

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.6\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.6\text{ } \%/10\text{K}$

percentage of full scale value

Protection

IP 66 (EN 60529)

Standard version

Connection (wetted parts)

NG 63: 2 x G¹/₄B - spanner size 14
 centre back (brass)

NG 100: 2 x G¹/₂B - spanner size 22
 bottom (stainless steel)

2 x G¹/₂B - spanner size 22
 centre back (brass)

(EN 837-3/7.3)

Measuring element (wetted part)

Capsule element, CuBe alloy

Movement (wetted part)

Brass

Seal (wetted part)

„Perbunan“ nitrile rubber

Dial (wetted part)

Aluminium, white

Dial marking black

Pointer (wetted part)

Aluminium, black

Housing (wetted part)

Stainless steel 1.4301

Bayonet type bezel/crimped bezel

Stainless steel 1.4301

Front glass (wetted part)

Plastic (PMMA)

Mounting

Wall mounting via back flange or 3-hole fixing, panel mounting bezel (each as option). Direct mounting to rigid measuring pipe possible.

Options

- Back flange
- 3-hole fixing, panel mounting bezel
- Hose connections

Standard capsule type pressure gauges for differential pressure

Type D 9 - NG 63/Type D 4 - NG 100/160

Housing types and dimensions

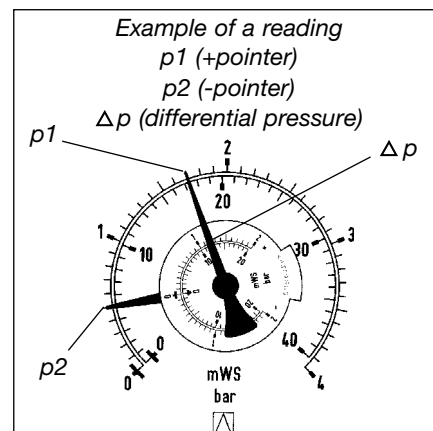
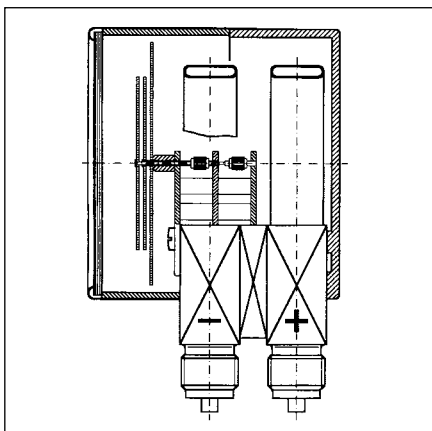
Bottom connection (NG 100/160)	Bottom connection, back flange (NG 100/160)
Back connection (NG 100/160)	Back connection, 3-hole fixing, panel mounting bezel (NG 100)
Back connection (NG 63)	Back connection, 3-hole fixing, panel mounting bezel (NG 63)

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	c	d1*	d2	d3*	D1	D2	D3	e1	e2	g	G	h	S	S1	S2	S3	SW
63	-	-	30.5	-	2	75	85	3.6	68	62	64.3	-	20	53	G ¹ / ₄ B	-	14	-	6	2	14
100	16	18	49	51	3	116	133	4.5	101	99	-	32	34.5	79	G ¹ / ₂ B	86	20	5	2.5	3	22
160	16	19	49	52	3	178	196	4.5	161	159	-	32	34.5	79	G ¹ / ₂ B	118	20	6	4.5	2	22

* Dimensions according to DIN EN 837-1

Standard Bourdon tube pressure gauges for differential pressure



Application

For differential pressure measurement of gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys. Specially suitable for heating systems (supply and return pipes).

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

D 2

Nominal size

100

Function

The pressures are measured in two independent Bourdon tube systems („plus“ pressure = high pressure, „minus“ pressure = low pressure). The pressure is indicated on a dial by a pointer. The differential pressure scale covers 50 % of the range of the „plus“ pressure and 50 % of the range of the „minus“ pressure. The black pointer („plus“ connection) and the red pointer („minus“ connection) at the differential pressure gauge scale allow you to read the pressures in either system on the fixed scale.

Accuracy class (EN 837-1 /6)

1.6

Ranges (EN 837-1/5)

0/0.6 to 0/60 bar

Application area

The maximum pressure in the system must not exceed the full scale value. To ensure good readability, the differential pressure to be measured should not be less than approx. 20 % of the full scale value.

Operating temperature range

Medium: $T_{max} = +60\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:

rising temp. approx. $\pm 0.4\text{ %}/10\text{K}$

falling temp. approx. $\pm 0.4\text{ %}/10\text{K}$

percentage of full scale value

Protection

IP 32 (EN 60529)

Standard version

Connection

Brass, bottom, parallel in line
 2 x G $1/2$ B - spanner size 22
 (EN 837-1/7.3)

Measuring element

Bourdon tube element,
 $\leq 60\text{ bar}$ „C“ type bourdon tube, copper alloy
 $> 60\text{ bar}$ helical tube, 1.4571

Movement

Brass

Dial

Aluminium, white
 Dial marking black (bar/mWC)

Pointer/dial

Aluminium

Housing

Sheet steel, black

Push-on bezel

Sheet steel, black

Front glass

Instrument glass

Options

- Wetted parts stainless steel
- Stainless steel housing and push-on bezel
- Nominal size 160 (D 1)
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw

Standard Bourdon tube pressure gauges for differential pressure *Type D 2 - NG 100*

Housing types and dimensions

<i>Bottom connection</i>	<i>Bottom connection, back flange</i>
<i>Bottom connection, 3-hole fixing, panel mounting bezel</i>	

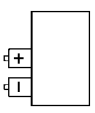
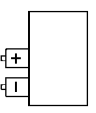
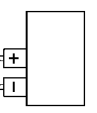
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	G	h	k	s	s1	s2	SW		
100	15.6	19.1	84	87.5	6	3	20	116	132	4.8	G ¹ / ₂ B	86	32	2	5.5	3	22		

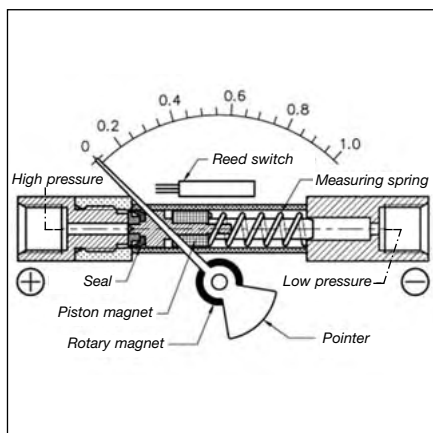
* Dimensions according to DIN EN 837-1

Standard capsule type/Bourdon tube pressure gauges for differential pressure

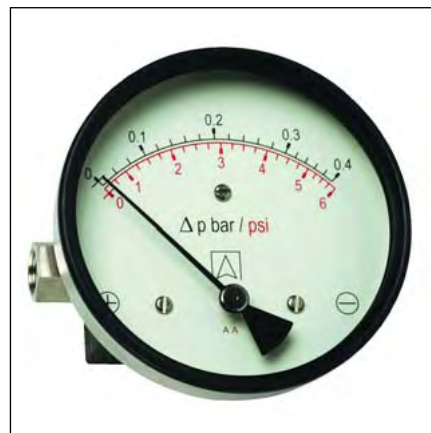
DG: M

Type	KP63Dif, D911	KP100Dif, D401	KP100Dif, D411	KP160Dif, D401	KP160Dif, D411	RF100Dif, D201	RF100Dif, D301	RF160Dif, D101
Version								
Housing Ø	63	100	100	160	160	100	100	160
Housing	Stainless steel 1.4301, plastic front glass					Sheet steel	Stainless steel	Polyamide
Meas. elem.	Capsule element, CuBe alloy					Bourdon tube element, copper alloy		
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G ¹ / ₄ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B
						Dual scale bar/mWC, black		
Range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
0/4 mbar	---	---	---	35612401	35612411	---	---	---
0/6 mbar	---	35563401	35563411	35613401	35613411	---	---	---
0/10 mbar	---	35564401	35564411	35614401	35614411	---	---	---
0/16 mbar	35515911	35565401	35565411	35615401	35615411	---	---	---
0/25 mbar	35516911	35566401	35566411	35616401	35616411	---	---	---
0/40 mbar	35517911	35567401	35567411	35617401	35617411	---	---	---
0/60 mbar	35518911	35568401	35568411	35618401	35618411	---	---	---
0/100 mbar	35519911	35569401	35569411	35619401	35619411	---	---	---
0/160 mbar	35520911	35570401	35570411	35620401	35620411	---	---	---
0/250 mbar	35521911	35571401	35571411	35621401	35621411	---	---	---
0/400 mbar	35522911	35572401	35572411	35622401	35622411	---	---	---
Price €								
0/0.6 bar	---	---	---	---	---	85609201	85609301	---
0/1 bar	---	---	---	---	---	85610201	85610301	85660101
0/1.6 bar	---	---	---	---	---	85611201	85611301	85661101
0/2.5 bar	---	---	---	---	---	85612201	85612301	85662101
0/4 bar	---	---	---	---	---	85613201	85613301	85663101
0/6 bar	---	---	---	---	---	85614201	85614301	85664101
0/10 bar	---	---	---	---	---	85615201	85615301	85665101
0/16 bar	---	---	---	---	---	85616201	85616301	85666101
0/25 bar	---	---	---	---	---	85617201	85617301	85667101
0/40 bar	---	---	---	---	---	85618201	85618301	85668101
Price €								
0/60 bar	---	---	---	---	---	85619201	85619301	85669101
0/100 bar	---	---	---	---	---	---	---	85670101
0/160 bar	---	---	---	---	---	---	---	85671101
0/250 bar	---	---	---	---	---	---	---	85672101
0/400 bar	---	---	---	---	---	---	---	85673101
Add. costs						Price €	Price €	Price €
Wetted parts 1.4571	---	---	---	---	---			

Magnetic piston type pressure gauges for differential pressure - high overload protection



- Extremely compact and robust stainless steel measuring system
- Selectable maximum static pressure PN 100/250/400
- Switching contacts can be retrofitted
- IP 65 protection for pressure gauge and switching contact
- Leak-proof due to mechanical separation of pressure chamber and display
- Various types of connections
- Housing diameters 80 and 100 mm
- Optional glycerine filling



Application

For differential pressure measurements with very high static pressures. For gaseous and liquid, non-adhesive media which are not highly viscous. Particularly suitable for monitoring filters, pumps, pipe systems and cooling circuits.

Type

MAG 80/100 Dif D312

Nominal size

80-100 mm

Function

The pressures act on two pressure chambers separated by a piston magnet. If there are different pressures in the chambers, the piston magnet is axially displaced against a pressure spring. This displacement is transmitted from the piston magnet to the pointer via a rotary magnet mounted to the pointer hub.

The differential pressure is directly displayed.

The complete mechanical separation of pressure chamber and display excludes the possibility of leaks.

Accuracy of measurement

±3 % of full scale value (at increasing differential pressure)

Ranges (EN 837-3/5)

0/0.25 bar to 0/10 bar

Maximum static pressure

100 bar

Overpressure safety

Up to the maximum static pressure on both sides

Operating temperature range

Medium: $T_{max} = 100\text{ °C}$

Ambient: $T_{min} = 0\text{ °C}$

$T_{max} = 80\text{ °C}$

Protection

IP 65 (EN 60529)

Standard version

Connection (wetted parts)

Stainless steel 1.4401,
Stainless steel 1.4401, on left and right hand side /directly opposite each other)

2 x G1/4 female thread –
spanner size 17 (EN 837-3/7.3)

Connection cover

Plastic, glass-fibre reinforced, black

Measuring element (wetted part)

Pressure spring

Stainless steel 1.4310

Magnetic piston (wetted part)

Stainless steel 1.4401/Strontium ferrite

Seal (wetted part)

NBR

Dial

Aluminium, white

Dial marking black/red (bar/psi)

Scale angle 90°

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with rubber sealing ring at the front

Front glass

Instrument glass

Mounting

Wall mounting via a back mounting plate (optional) or pipe mounting by a combination of back plate and fixing clamp for 2" pipe (optional).

Options

- Back mounting plate with fixing clamp
- 3-hole fixing, panel mounting bezel
- Max. static pressure PN 250/400
- Other connection threads
- Other connection designs
- Acrylic front glass
- Electrical contacts (Reed contacts)
- Filter in the „plus“ connection
- Glycerine filling
- Ref. pointer
- Special scales

Types and dimensions (mm)

Technical drawing of a circular mechanical component, showing two views: a front view (left) and a side view (right).

Front View (Left):

- Outer diameter: 110
- Inner diameter: 76,5
- Flange thickness: 4,2
- Flange thickness: 3x 120°
- Central hole diameter: 19
- Inner hole diameter: 10
- Outer hole diameter: 100
- Inner hole diameter: 80
- Flange thickness: 10

Side View (Right):

- Outer diameter: 110
- Inner diameter: 76,5
- Flange thickness: 4,2
- Central hole diameter: 19
- Inner hole diameter: 10
- Outer hole diameter: 100
- Inner hole diameter: 80
- Flange thickness: 10

Technical drawing of a pressure transmitter. The front view (left) shows a circular body with a diameter of 80 mm (MAG 80 = $\varnothing 83$) and a mounting flange with a diameter of 104 mm (MAG 100 = $\varnothing 104$). The body has a central pressure port with a G1/4 connection. The side view (right) shows the transmitter's profile with a total height of 110 mm. The mounting flange has a thickness of 19 mm and a central hole with a diameter of 17 mm (SW 17). The distance between the mounting flange and the main body is 25.5 mm. The main body has a diameter of 44.5 mm. The distance between the main body and the mounting flange is 33 mm. The distance between the mounting flange and the main body is 42 mm. The distance between the mounting flange and the main body is 44 mm.

Fixing clamp

2" Rohr

150

MAG 80 = Ø63

MAG 100 = Ø104

SW17

25.5

19

44.5

Back mounting plate

MAG 80 = Ø82

MAG 100 = Ø102

85

68

50

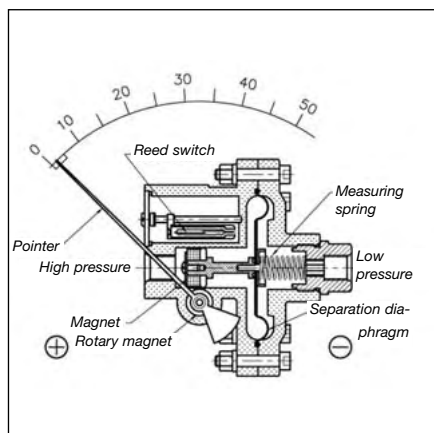
G1/4

76.5

110

G1/4

Magnetic diaphragm pressure gauges for very low differential pressure



- Differential pressure ranges starting at 0/2.5 mbar
- Switching contacts can be retrofitted
- IP 65 protection for pressure gauge and switching contact
- Side or back connection
- Delivery includes adapter for hose connection and bracket for control panel mounting



Application

For differential pressure measurements with very low differential pressure. Especially suitable for gaseous media but in particular for monitoring filters and fans in air supply, air conditioning and ultra-clean room applications.

Type

MAG 115 Dif D311

Nominal size

115 mm

Function

The pressures act on two pressure chambers separated by a diaphragm. If there are different pressures in the chambers, a magnet is axially displaced against a pressure spring. This displacement is transmitted to the pointer via a rotary magnet fitted to the pointer hub. The differential pressure is directly displayed.

Accuracy of measurement

± 3 % of full scale value (at increasing differential pressure)

Ranges (EN 837-3/5)

0/2.5 mbar to 0/100 mbar

Maximum static pressure

2.4 bar

Overpressure safety

up to 2.4 bar on both sides

Operating temperature range

Medium: $T_{max} = 60$ °C

Ambient: $T_{min} = 0$ °C

$T_{max} = 60$ °C

Protection

IP 65 (EN 60529)

Standard version

Connection (wetted parts)

Nylon 66, glass-fibre reinforced, choice of left and right hand side, or back (use enclosed blind plugs)
2 x 1/8 NPT female thread or
2 x hose connection 5 mm
(use enclosed adaptors)

Measuring element (wetted part)

Diaphragm: NBR

Pressure spring: stainless steel
1.4310

Transmission unit:

Stainless steel 1.4401

Magnet (wetted part)

Strontium-ferrite

Seal (wetted part)

NBR

Dial

Aluminium, white

Dial marking black

Scale angle 90° (first graduation after zero at 15% of full scale value)

Pointer

Aluminium, black

Housing

Stainless steel 1.4301 with rubber sealing ring at the front

Front glass

Instrument glass

Mounting

Panel mounting via mounting clips (standard), or wall mounting via back mounting plate (optional) or pipe mounting via a combination of back mounting plate and fixing clamp (optional) for 2" pipe

Options

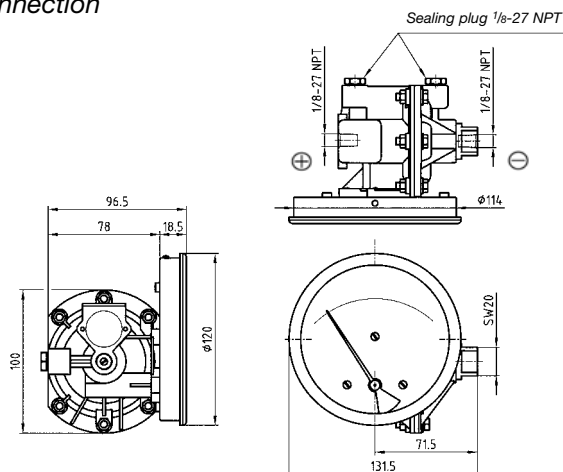
- Back mounting plate with fixing clamp
- Acrylic front glass
- Electrical contacts (Reed contacts)
- Special scales



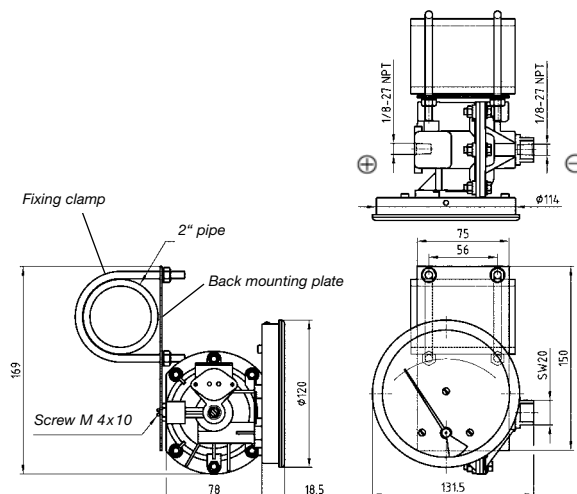
Magnetic diaphragm pressure gauges for very low differential pressure Type D 3 NG 115

Types and dimensions (mm)

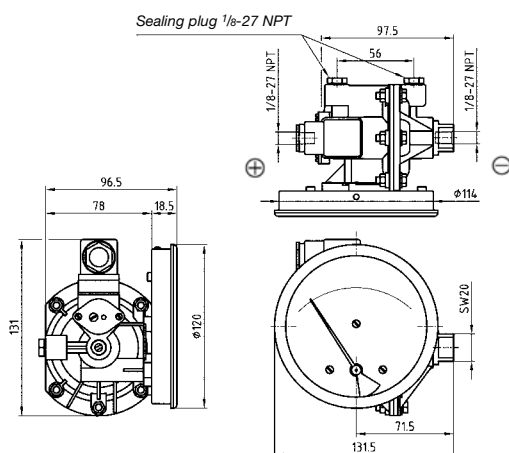
Connection on left and right hand side or back connection



Back mounting plate and fixing clamp



Connection on left and right hand side or back connection with electrical contact

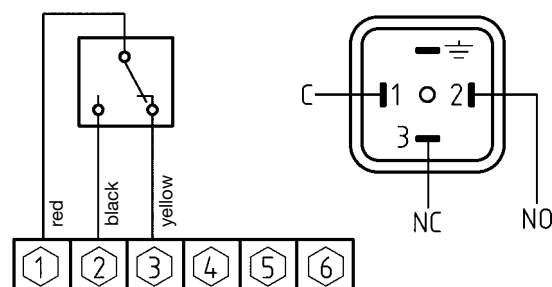


Technical specifications electrical contact

Version: Reed contact, single pole changeover (SPDT)

Max. switching voltage: AC/DC 175 V
Max. switch rating: AC 5 VA – DC 5 W
Max. current: AC/DC 250 mA
Switching hysteresis: approx. 5 %
Adjustment range: 40-80 % of full scale value
Electrical connection: plug DIN 43650-A

Wiring diagram



Magnetic piston type pressure gauges/magnetic diaphragm pressure gauges for differential pressure



DG: M

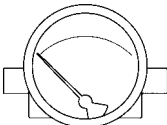
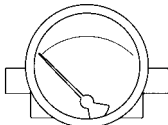
Type	MAG 80 Dif, D312	MAG 100 Dif, D312	MAG 80 Dif, RK1.W, D312	MAG 100 Dif, RK1.W, D312	MAG 115 Dif, D311	MAG 115 Dif, RK1.W, D311
Version						
Housing Ø	80	100	80	100	115	115
Housing	Stainless steel 1.4301 with rubber seal at the front					
Meas. elem	refer to data sheet					
Accuracy	±3 % of full scale value (at increasing differential pressure)					
Connection	2 x G ¹ / ₄ female thread				2 x ¹ / ₈ NPT female thread	
Max. static pressure	PN 100				PN 2,4	
Contact type	---	---	Reed, single, changeover*	Reed, single, changeover*	---	Reed, single, changeover*
Electrical connection	---	---	Plug DIN 43650-A	Plug DIN 43650-A	---	Plug DIN 43650-A
Range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
0/2.5 mbar	---	---	---	---	88002311	88013311
0/4 mbar	---	---	---	---	88003311	88014311
0/6 mbar	---	---	---	---	88004311	88015311
0/10 mbar	---	---	---	---	88005311	88016311
0/16 mbar	---	---	---	---	88006311	88017311
0/25 mbar	---	---	---	---	88007311	88018311
0/40 mbar	---	---	---	---	88008311	88019311
0/60 mbar	---	---	---	---	88009311	88020311
0/100 mbar	---	---	---	---	88010311	88021311
0/160 mbar	---	---	---	---	---	---
Price €						
0/0.25 bar	88002312	88013312	88022312	88033312	---	---
0/0.4 bar	88003312	88014312	88023312	88034312	---	---
0/0.6 bar	88004312	88015312	88024312	88035312	---	---
0/1 bar	88005312	88016312	88025312	88036312	---	---
0/1.6 bar	88006312	88017312	88026312	88037312	---	---
0/2.5 bar	88007312	88018312	88027312	88038312	---	---
0/4 bar	88008312	88019312	88028312	88039312	---	---
0/6 bar	88009312	88020312	88029312	88040312	---	---
0/10 bar	88010312	88021312	88030312	88041312	---	---

* Please specify required switching point!

Add. costs for magnetic piston type pressure gauges/magnetic diaphragm pressure gauges



DG: M

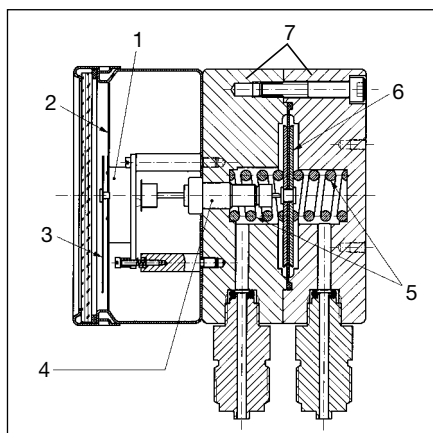
Type	MAG 80 Dif, D312	MAG 100 Dif, D312	MAG 115 Dif, D311
Version			
	Price €	Price €	Price €
Maximum static pressure PN 250			---
Maximum static pressure PN 400			---
Centre back connection (electrical contacts not possible)			---
Bottom connection			---
Connection 1/4 NPT female thread			---
Connection G1/4B male thread (adaptor)			---
Connection G1/2B male thread (adaptor)			---
Connection 1/2 NPT male thread (adaptor)			---
Piston seal Viton			---
3-hole fixing, panel mounting bezel (can only be factory fitted)			---
Acrylic front glass			
Instrument grade front glass, hardened			
Glycerine filling			---
„Plus“ connection right (pointer moves from right to left)	no add. cost	no add. cost	---
Ref. pointer			---
Adjustable red reference pointer			
Filter in „plus“ connection			---
Reed contact, double pole changeover (SPDT) RK2.W (additional cost relative to basic unit with single pole change-over Reed contact RK1.W !)			---

Accessories

DG: M

Type	MAG 80 Dif, D312	MAG 100 Dif, D312	MAG 115 Dif, D311
	Price € Part no.	Price € Part no.	Price € Part no.
Aluminum back mounting plate and fixing clamp for wall mounting or 2" pipe mounting.	38001	38001	38304
Plastic mounting plate for wall mounting	38305	38305	---

Spring-diaphragm pressure gauges for differential pressure - overload protected



Function overview

1. Movement
2. Dial
3. Pointer
4. Transmission unit
5. Measuring spring
6. Diaphragm
7. Measuring flange



Application

For differential pressure measurement with low differential pressure and high static pressure. For gaseous and liquid media with low viscosity and non-corrosive. Particularly suitable for monitoring filters, pumps and pipe systems.

Type

MF 100 Dif D401

Nominal size

100

Function

The pressures act on two pressure chambers separated by an elastic diaphragm. Different pressures in the chambers cause an axial deflection of the diaphragm against a pressure spring which is proportional to the pressure. This is transmitted to the movement via a rod. The differential pressure is directly indicated by a pointer. The diaphragm is held by metallic supports at both sides providing an overpressure safety of up to 25 bar.

Accuracy class (EN 837-3/6)

2.5

Ranges (EN 837-3/5)

0/250 mbar to 0/6 bar

Maximum static pressure

25 bar

Overpressure safety

Up to 25 bar on both sides

Operating temperature range

Medium: $T_{max} = +60\text{ °C}$
 Ambient: $T_{min} = -20\text{ °C}$
 $T_{max} = +60\text{ °C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from 20 °C:
 rising temp. approx. $\pm 0.5\text{ %}/10\text{K}$
 falling temp. approx. $\pm 0.5\text{ %}/10\text{K}$
 percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Brass, nickel plated, bottom, parallel in line
 2 x G $\frac{1}{2}$ B - spanner size 22
 (EN 837-3/7.3)

Measuring element

Pressure spring
 stainless steel 1.4310

Diaphragm

Viton

Measuring flange

Aluminium eloxed

Movement

Brass

Dial

Aluminium, white
 Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

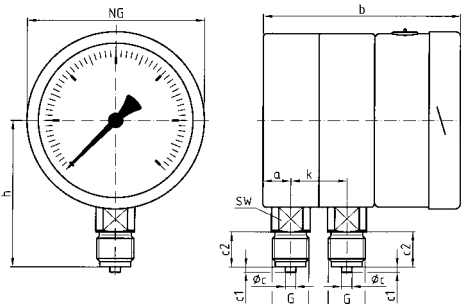
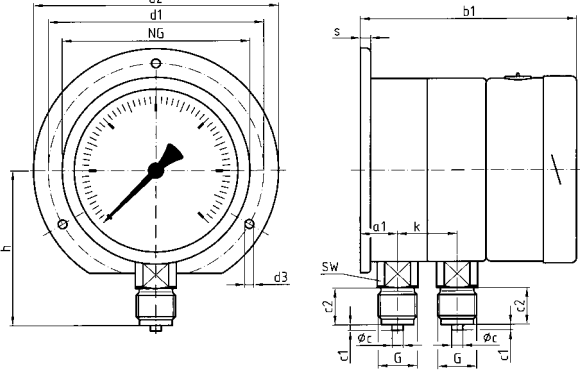
Options

- Back flange
- Other connections

Spring-diaphragm pressure gauges for differential pressure

Type D 4 - NG 100

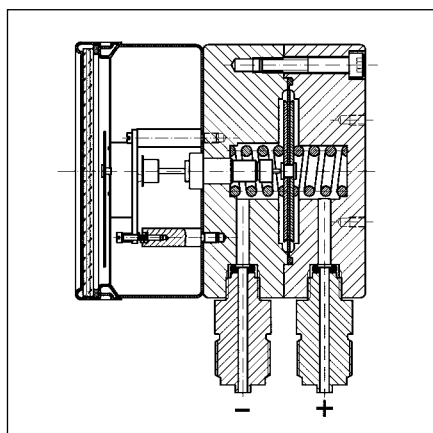
Housing types and dimensions

<i>Bottom connection</i> 	<i>Bottom connection, back flange</i> 

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1	d2	d3	G	h	k	s	SW
100	16	19.5	112.5	116	6	3	20	116	132	4.8	G1/2B	84	32	5.5	22

Spring-diaphragm pressure gauges for differential pressure and chemical applications - overload protected



Application

For differential pressure measurement with low differential pressure and high static pressure. For corrosive, gaseous and liquid media which are not highly viscous, also for use in corrosive atmospheres. Particularly suitable for monitoring filters, pumps and pipe systems.

Types

MF 100 Ch Dif D402

MFW 100 Ch Dif D402

Nominal size

100

Function

The pressures act on two pressure chambers separated by an elastic diaphragm. Different pressures in the chambers cause an axial deflection of the diaphragm against a pressure spring which is proportional to the pressure. This is transmitted to the movement via a rod. The differential pressure is directly indicated by a pointer. The diaphragm is held by metallic supports at both sides which provides for an overpressure safety of up to 25 bar.

Accuracy class (EN 837-3/6)

2.5

Ranges (EN 837-3/5)

MF 100: 0/250 mbar to 0/6 bar

MFW 100: 0/250 mbar to 0/25 bar

Maximum static pressure

25 bar

Overpressure safety

up to 25 bar on both sides

Operating temperature range

Medium: $T_{max} = +60\text{ }^{\circ}\text{C}$

Ambient: $T_{min} = -20\text{ }^{\circ}\text{C}$

$T_{max} = +60\text{ }^{\circ}\text{C}$

Temperature performance

Indication error when the temperature of the measuring element deviates from $20\text{ }^{\circ}\text{C}$:

rising temp. approx. $\pm 0.5\text{ } \%/10\text{K}$

falling temp. approx. $\pm 0.5\text{ } \%/10\text{K}$

percentage of full scale value

Protection

IP 54 (EN 60529)

Standard version

Connection

Stainless steel 1.4571, bottom, parallel in line

2 x G1/2B - spanner size 22

(EN 837-3/7.3)

Measuring element

Pressure spring

stainless steel 1.4310

Diaphragm

Viton

Measuring flange

Stainless steel 1.4571

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

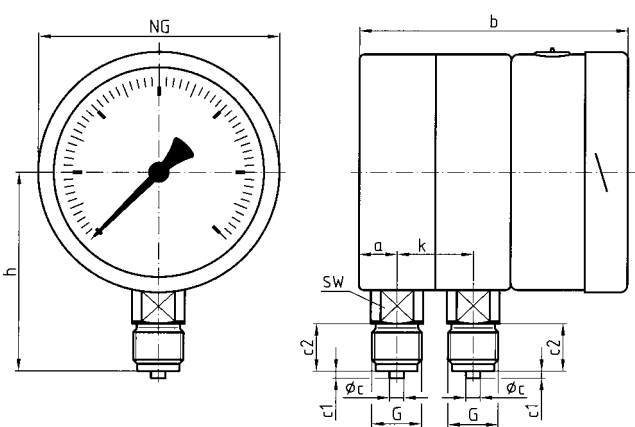
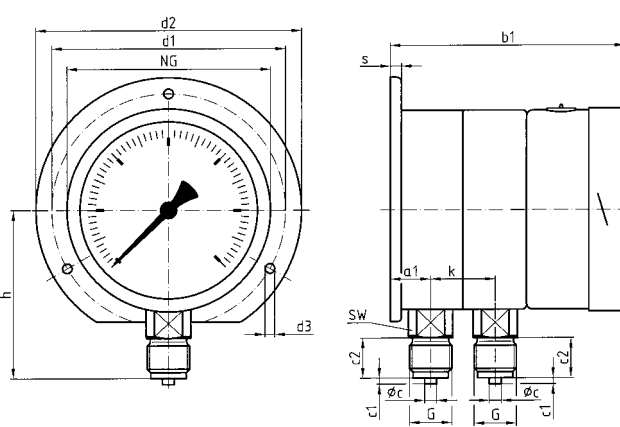
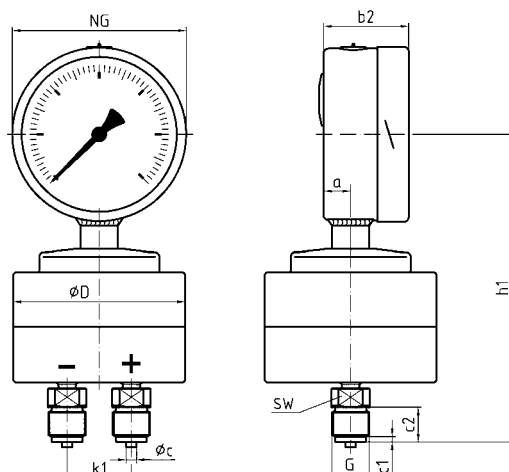
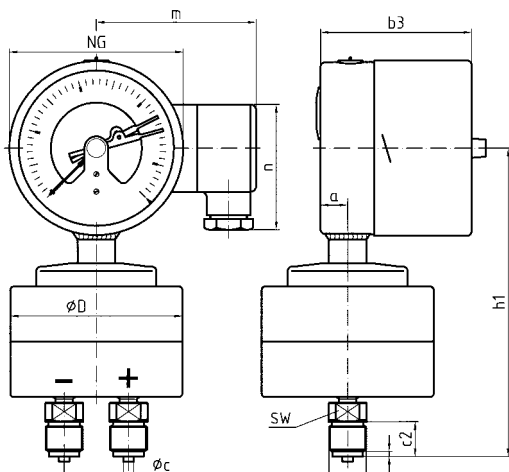
Options

- Back flange (MF 100)
- Other connections
- Electrical contacts (MFW 100)

Spring-diaphragm pressure gauges for differential pressure and chemical applications



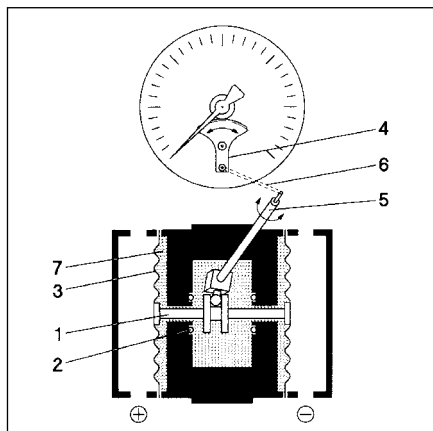
type D 4 – NG 100 Housing types and dimensions

MF 100 Ch Dif D402 Bottom connection 	MF 100 Ch Dif D472 Bottom connection, back flange 
MFW 100 Ch Dif D402 Bottom connection 	MFW 100 Ch Dif D402 Bottom connection with electrical contacts 

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1	d2	d3	ØD	G	h	h1	k	k1	m
100	16	19	84	87.5	49	87	6	3	20	116	132	4.8	99	G1/2B	86	177	32	37	92
Nominal size (NG)	n	s	s1	s2	SW														
100	72	2	5.5	3	22														

Diaphragm pressure gauges for differential pressure for chemical applications - high overload protection



Function overview

1. Connection rod
2. O ring, overpressure-proof
3. Diaphragm
4. Movement
5. Measuring shaft
6. Transmission lever
7. Pressure transmission liquid



Application

For differential pressure measurement with low differential pressure and very high static pressure.

For corrosive, gaseous and liquid media, also for use in corrosive atmospheres. Since the pressure chambers can be flushed, the units are also suitable for polluted media.

! When measuring gas or vapour, the instruments must be used in accordance with the safety recommendations of EN 837-2 (see appendix).

Type

PF 100/160 Dif H D402

Nominal size

100 - 160

Function

Each of the pressures acts on a diaphragm. The diaphragms are connected via a rod. To compensate for the static pressure, the chamber between the diaphragms is filled with pressure transmission liquid. At identical pressures, both diaphragms are in „rest“ position. If the pressures are different, the diaphragms change their shape in the direction of the lower pressure. This displacement is picked up by the movement. The differential pressure is directly indicated by a pointer.

Accuracy class (EN 837-3/6)

1.6

Ranges (EN 837-3/5)

NG 100 0/0.6 to 0/25 bar

NG 160 0/40 mbar to 0/25 bar

Maximum static pressure

40 bar/100 bar

Overpressure safety

Up to the maximum static pressure on one side

Operating temperature range

Medium: $T_{max} = +100\text{ °C}$

Ambient: $T_{min} = -20\text{ °C}$

$T_{max} = +80\text{ °C}$

Protection

IP 54 (EN 60529)

Standard version

Connection

Stainless steel, bottom

Flange connection based on DIN 19213

2 x G $\frac{1}{2}$ female thread

Measuring element

Diaphragm,

$\leq 400\text{ mbar}$ stainless steel 1.4571

$> 400\text{ mbar}$ Duratherm

Intermediate block

AlMgSiPb – hard coated

Pressure transmission liquid

Acid free oil

Zero correction

through top housing opening
 $\pm 25\%$ of full scale value

Seals

FPM (Viton)

Movement

Stainless steel

Dial

Aluminium, white

Dial marking black

Pointer

Aluminium, black

Housing

Stainless steel 1.4301

Bayonet type bezel

Stainless steel 1.4301

Front glass

Laminated safety glass

Mounting

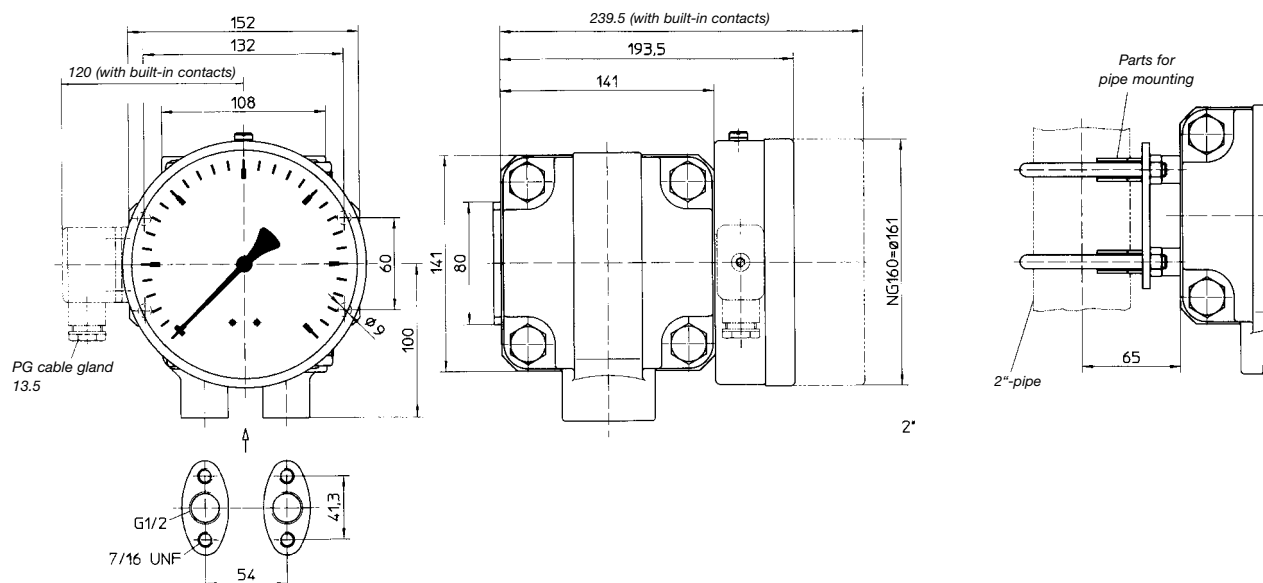
Wall mounting via a back mounting plate (optional) or pipe mounting by a combination of a back mounting plate and fixing clamp (optional) for 2" pipe

Options

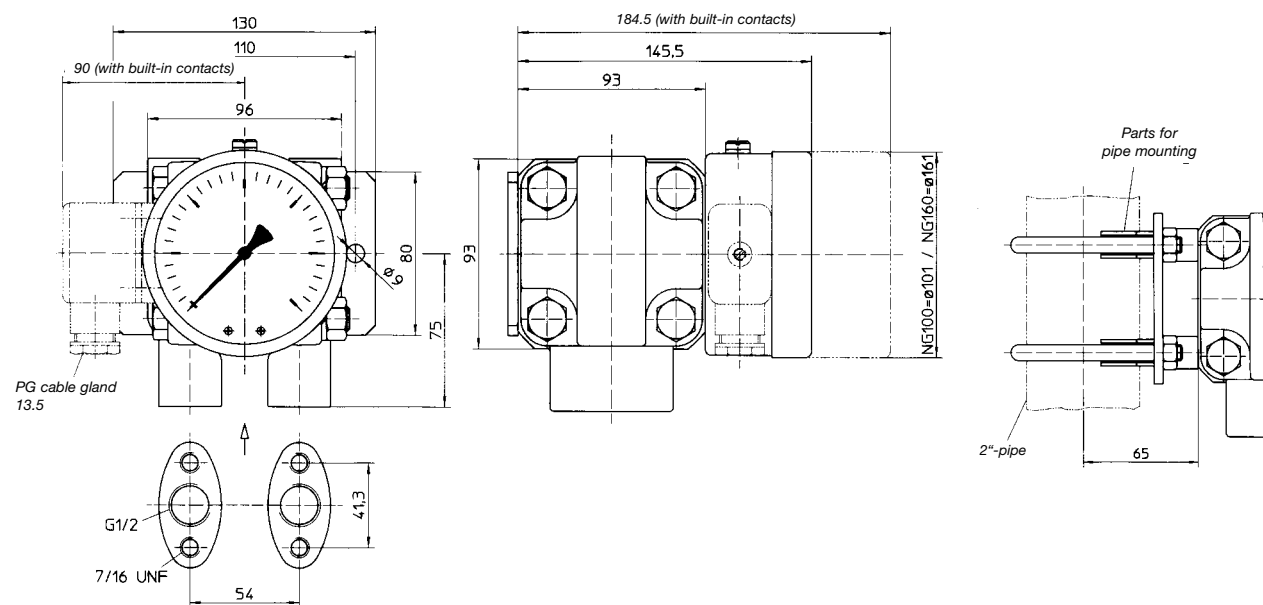
- Fixing clamp for 2" pipe
- Glycerine filling (type D 802)
- Electrical contacts ($> 100\text{ mbar}$)

Diaphragm pressure gauges for differential pressure for chemical applications - high overload protection Type D 4 - NG 100/160 Housing types and dimensions (in mm)

Ranges 0/40 to 0/400 mbar NG 160

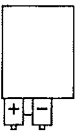
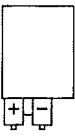
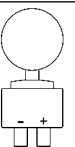
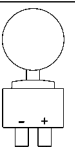
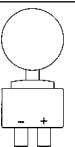
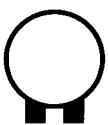


Ranges 0/0.6 to 0/25 bar NG 100/160



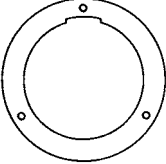
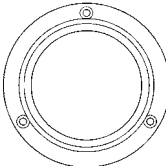
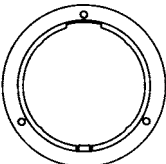
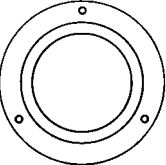
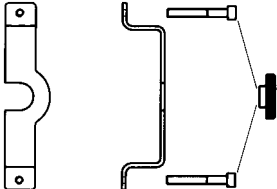
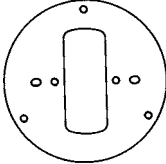
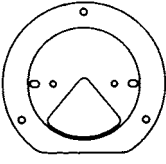
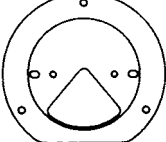
Spring-diaphragm pressure gauges/diaphragm pressure gauges for differential pressure

DG: H

Type	MF 100 Dif, D401	MF 100 Ch Dif, D402	MFW 100 Ch Dif, D402	MFW 100 Ch Dif, MK1 D402	MFW 100 Ch Dif, IK1 D402	PF 100 Ch Dif H, D402	PF 160 Ch Dif H, D402
Version							
Housing-Ø	100	100	100	100	100	100	160
Housing	Stainless steel 1.4301, bayonet type bezel stainless steel 1.4301						
Meas. elem.	refer to data sheet					Stainless steel/Duratherm	
Accuracy class	2.5	2.5	2.5	2.5	2.5	1.6	1.6
Connection	2 x G ¹ / ₂ B	2 x G ¹ / ₂ B	2 x G ¹ / ₂ B	2 x G ¹ / ₂ B	2 x G ¹ / ₂ B	Flange connection based on DIN 19213, 2 x G ¹ / ₂ female thread	
Max. static pressure	25 bar	25 bar	25 bar	25 bar	25 bar	40 bar	
Range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
0/40 mbar	---	---	---	---	---	---	88022402
0/60 mbar	---	---	---	---	---	---	88023402
0/100 mbar	---	---	---	---	---	---	88024402
0/160 mbar	---	---	---	---	---	---	88025402
0/250 mbar	88086401	88086402	88106402	88126402	88146402	---	88026402
0/400 mbar	88087401	88087402	88107402	88127402	88147402	---	88027402
0/600 mbar	88088401	88088402	88108402	88128402	88148402	88008402	88028402
Price €							
0/1 bar	88089401	88089402	88109402	88129402	88149402	88009402	88029402
0/1.6 bar	88090401	88090402	88110402	88130402	88150402	88010402	88030402
0/2.5 bar	88091401	88091402	88111402	88131402	88151402	88011402	88031402
0/4 bar	88092401	88092402	88112402	88132402	88152402	88012402	88032402
0/6 bar	88093401	88093402	88113402	88133402	88153402	88013402	88033402
0/10 bar	---	---	88114402	88134402	88154402	88014402	88034402
0/16 bar	---	---	88115402	88135402	88155402	88015402	88035402
0/25 bar	---	---	88116402	88136402	88156402	88016402	88036402
Add. costs	Price €						
Max. static pressure PN 100	---	---	---	---	---		
Glycerine filling							
Wall mounting	Back flange		Connection piece for instrument bracket is standard. Refer to page 389 for instrument brackets.			Standard	
Pipe mounting (2")	---	---	---	---	---		

Accessories for panel mounting and wall mounting

DG: M

Type	Housing diameter (mm)	50	63	100	160
	Description	Price € Part-no.	Price € Part-no.	Price € Part-no.	Price € Part-no.
	3-hole fixing, panel mounting bezel Stainless steel 1.4301, bare metal surface, for retrofitting (with mounting aid) to RF 63, 100 centre back D7/D9 (stainless steel housing with crimped bezel)	---	38015	38017	---
	3-hole fixing, panel mounting bezel Stainless steel 1.4301, bare metal surface, for retrofitting (front) to RF 63 centre back or bottom D6/D7/D9 (plastic or stainless steel housing with crimped bezel)	---	38019	---	---
	3-hole fixing, panel mounting bezel Plastic, black, for retrofitting to RF 63 back D611 (plastic housing with crimped bezel)	---	38003	---	---
	3-hole fixing, panel mounting bezel (bayonet type) Stainless steel 1.4301, polished, for factory-mounting to RF 100, 160 D4/D8 KP 63, 100, 160 D4 (stainless steel housing with bayonet type bezel)	---	38054	38056	38057
	Clamp fixing Stainless steel 1.4301, bare metal surface, with 2 hex socket screws M4 and knurled knob as mounting aid for retrofitting to RF 50, 63 D611 (plastic housing) RF 50, 63 D711 (stainless steel housing)	38033	38034	---	---
	Back flange Plastic, black, for retrofitting to RF 63 bottom D601 (plastic housing with crimped bezel)	---	38018	---	---
	Back flange Stainless steel 1.4301, bare metal surface, for factory-fitting to RF 63, 100, 160 D3/D4/D7/D8/D9 KP 63, 100, 160 D3/D4 (stainless steel housing)	---	38048	38050	38051
	Back flange Steel sheet, black, for factory-fitting to RF 100, 160 D2 KP 63, 100, D2 (steel sheet housing)	---	38042	38044	38045

Pressure gauge stop cocks and valves



Pressure gauge stop cocks

Application

Shut-off element between pipe and pressure gauge. Stop cocks with test port allow you to connect both pressure gauges and testing devices to the pipe. Suitable for liquids, gases and steam.

Version

DIN 16261 to 16263 (or based on DIN)

Operating temperature range

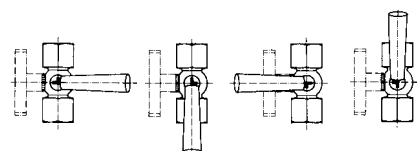
Medium: -10/+50 °C

Connection and nominal pressure
refer to price list on page 386

Housing and tap

Brass bare metal surface or stainless steel bare metal surface. The tap contains two holes which are arranged in the shape of a T. The function depends on the tap position:

1. Vent pressure gauge
2. Apply pressure to pressure gauge
3. Blow out measuring pipe
4. Apply pressure to testing device



Vent Operation Blow out Test



Pressure gauge stop valves

Application

Shut-off or reducing element between pipe and pressure gauge. Stop valves with test port allow you to connect both, pressure gauges and testing devices, to the pipe. Suitable for liquids, gases and steam.

Version

DIN 16270 without test port

DIN 16271 with test port

DIN 16272 with test port which can be closed separately

Design A female/female x male connector

Design B loose female coupling x male connector and shaft for instrument holder

Materials

Parts	Brass	Steel	Stainl. steel
Housing	Brass	1.0460	1.4571
Valve spindle	1.4104	1.4104	1.4571
Valve cone	1.4104	1.4104	1.4571
Packing	PTFE	PTFE	PTFE
Cap	Steel	Steel	Stainl. steel
Union nut	Steel	Steel	Stainl. steel
Fem./fem. connector	Steel	Steel	Stainl. steel
Loose fem. coupling	Brass	Steel	Stainl. steel
Vent screw	1.4571	1.4571	1.4571
Wheel	plastic	plastic	plastic



Operating temperature range

Brass -10/+120 °C

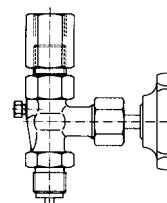
Steel 1.0460 -10/+120 °C

Stainl. steel 1.4571 -20/+200 °C

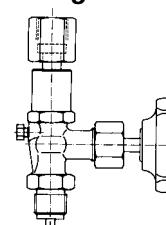
Connection and nominal pressure
refer to price list on pages 386/387

DIN 16270

Design A

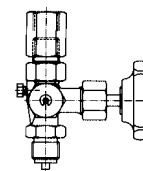


Design B

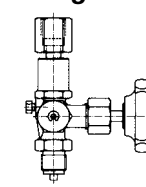


DIN 16271

Design A

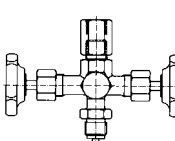


Design B

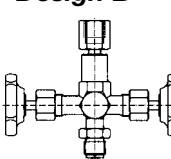


DIN 16272

Design A



Design B



Push-button stop cock/overpressure device



Push-button stop cock

Application

Shut-off element between pipe and pressure gauge. Normally, the push-button stop cock is closed. In this state no pressure is applied to the pressure gauge. Push button to apply pressure to the pressure gauge and to display the operating pressure. Suitable for gases.

Version

DVGW- and SVGW-tested, with EC type approval, product ID number CE-0085AQ0985

Operating temperature range

Medium: 0/+70 °C

Ambient: -20/+60 °C

Connection

2 x female thread Rp1/2, DIN 2999

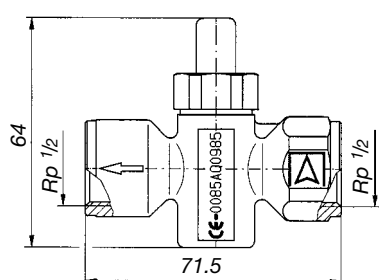
Nominal pressure

5 bar (MOP 5)

Housing

Brass, nickel-plated

Dimensions (in mm)



Overpressure safety device

Application

Adjustable overpressure device used to protect the system against peak pressures exceeding the maximum rating of the pressure gauge. For use at measuring points which are subject to great pressure variations; it enables the use of different pressure gauges with different ranges to be used and measure even the lower pressures accurately. The overpressure safety devices are adjusted according to the maximum pressure ratings of the various pressure gauges installed.

Operation

When the set pressure is reached, a piston valve shuts off the port to the pressure gauge. After the pressure has dropped down again to a value of approx. 25 % below the closing pressure, the valve opens again.

Operating temperature range

Max. +80 °C

Overpressure safety

Brass 600 bar

Stainless steel 1,000 bar

Max. vacuum range up to -1 bar, no adjustment function



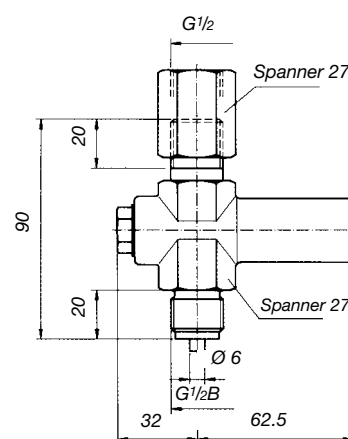
Materials

Parts	Brass	Stainl. steel
Housing	Brass	1.4571
Piston	1.4571	1.4571
Female/fem. connector	Steel	1.4305
Diaphragm	FPM	FPM
O ring	FPM	FPM
Closing plug	Brass	A4

Connection

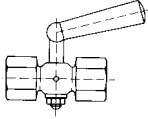
G1/2 female x male connector

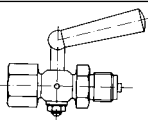
Dimensions (in mm)

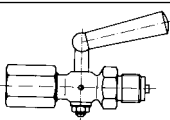


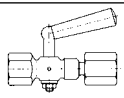
Accessories for pressure gauges

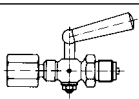
DG: E

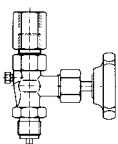
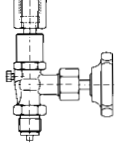
Pressure gauge stop cock female x female					
	Connection	Nominal pressure	Material	Part no.	Price €
	G ¹ / ₄	PN 6	Brass	63001	
	G ³ / ₈	PN 16	Brass	63002	
	G ¹ / ₂	PN 16	Brass	63003	
with round test flange 40 x 5	G ¹ / ₂	PN 16	Brass	63004	
with test flange 60 x 25 x 10	G ¹ / ₂	PN 16	Brass	63005	
with sealing gland	G ¹ / ₂	PN 16	Brass	63006	

Pressure gauge stop cock female x male					
	Connection	Nominal pressure	Material	Part no.	Price €
	G ¹ / ₄	PN 6	Brass	63011	
	G ³ / ₈	PN 16	Brass	63012	
	G ¹ / ₂	PN 16	Brass	63013	
with round test flange 40 x 5	G ¹ / ₂	PN 16	Brass	63009	
with test flange 60 x 25 x 10	G ¹ / ₂	PN 16	Brass	63010	

Pressure gauge stop cock female/female connector x male					
	Connection	Nominal pressure	Material	Part no.	Price €
	G ¹ / ₄	PN 6	Brass	63014	
	G ¹ / ₂	PN 16	Brass	63027	
	G ¹ / ₂	PN 16	1.4571	63090	
with test flange 60 x 25 x 10	G ¹ / ₂	PN 16	Brass	63028	
with test flange 60 x 25 x 10	G ¹ / ₂	PN 16	1.4571	63091	
with test socket M20 x 1.5	G ¹ / ₂	PN 16	Brass	63015	
with test socket M20 x 1.5	G ¹ / ₂	PN 16	1.4571	63016	

Pressure gauge stop cock with loose rotatable female coupling x female					
	Connection	Nominal pressure	Material	Part no.	Price €
	G ¹ / ₂	PN 16	Brass	63017	
with test flange 60 x 25 x 10	G ¹ / ₂	PN 16	Brass	63018	

Pressure gauge stop cock with loose rotatable female coupling x male					
	Connection	Nominal pressure	Material	Part no.	Price €
	G ¹ / ₂	PN 16	Brass	63107	
with test flange 60 x 25 x 10	G ¹ / ₂	PN 16	Brass	63024	

Pressure gauge stop valve DIN 16270									
Design A-female/female x male connector									
Design B-rotatable loose female coupling x male connector and shaft for instrument holder									
Design A	Design B	Connection	Nom. pressure	Material	Design A	Price €	Design B	Price €	
					Part no.		Part no.		
		G1/4	PN 125	Brass	63094		---	---	
		G1/2	PN 250	Brass	63092		63046		
		G1/2	PN 400	Steel	63040		63047		
G1/2		PN 400	1.4571	63093		63048			
Test socket M20 x 1.5 DIN 16271		G1/2	PN 250	Brass	63041		63049		
		G1/2	PN 400	Steel	63042		63108		
		G1/2	PN 400	1.4571	63044		63109		
Add. cost for „oil and grease free“					63045		63110		
Add. cost for DVGW-tested						on request	---	---	

* Only for brass and stainless steel.

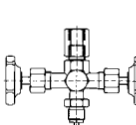
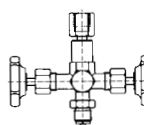
Accessories for pressure gauges

DG: E

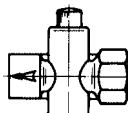
Pressure gauge dual stop valve DIN 16272 with test socket M 20 x 1.5

Design A-female/female x male connector

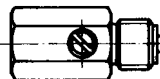
Design B-rotatable loose female coupling x male connector and shaft for instrument holder

Design B Rotatable valve manifold coupling X male connector and chart for instrument valve.								
Design A	Design B	Connection	Nom. pressure	Material	Design A	Price €	Design B	Price €
					Part no.		Part no.	
		G ¹ / ₂	PN 250	Brass	63111		63115	
		G ¹ / ₂	PN 400	Steel	63112		63116	
		G ¹ / ₂	PN 400	1.4571	63113		63117	
Add. cost for „oil and grease free“ (only for brass and stainless steel)					63114		63118	

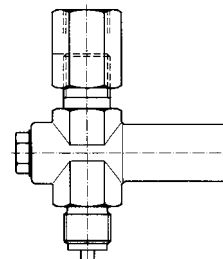
Push-button stop cock female x female - DVGW- and SVGW-tested/CE-0085AQ0985

	Connection	Nominal pressure	Material	Part no.	Price €
	Rp 1/2 DIN 2999	MOP 5	Brass, nickel-plated	63031	

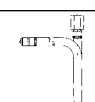
Damping device female x male - adjustable

	Connection	Nominal pressure	Material	Part no.	Price €
	G ¹ / ₂	PN 250	Brass	63074	
	G ¹ / ₂	PN 400	Steel	63075	
	G ¹ / ₂	PN 400	1.4571	63076	

Overpressure device G¹/₂ female/female connector x male - adjustable

	Adjustment range in bar	Material	Part no.	Price €	Material	Part no.	Price €
	0.4 - 2.5	Brass	63131		1.4571	63139	
	2 - 6	Brass	63132		1.4571	63140	
	5 - 25	Brass	63133		1.4571	63141	
	20 - 60	Brass	63134		1.4571	63142	
	50 - 250	Brass	63135		1.4571	63143	
	240 - 400	Brass	63136		1.4571	63144	
Add. cost for „oil and grease free“			63137			63145	
Add. cost for DVGW-tested			63138			63146	

Siphon DIN 16282 - outlet female/female connector G¹/₂

	Shape	Inlet	Material	Nom. pressure	Part no.	Price €
U-shape 	A*	G ¹ / ₂ B	Steel	PN 100	63147	
	B	without thread	Steel	PN 100	63148	
	A*	G ¹ / ₂ B	1.4571	PN 100	63149	
Circular shape 	C*	G ¹ / ₂ B	Steel	PN 100	63150	
	D	without thread	Steel	PN 100	63151	
	C*	G ¹ / ₂ B	1.4571	PN 100	63152	

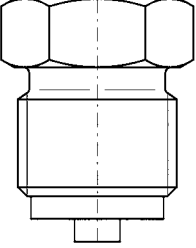
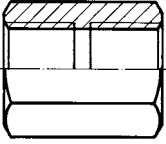
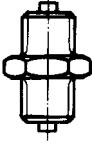
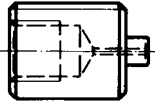
* Designs A and C are no longer provided for in the new DIN edition

Siphon - standard - inlet G¹/₂

U-shape 	Circular shape 	Shape	Outlet	Material	Nom. pressure	Part no.	Price €
		U-	G ¹ / ₂ B	Steel	PN 25	63085	
		U-	Female connector G ¹ / ₂ B	Steel	PN 25	63153	
		Circular	G ¹ / ₂ B	Steel	PN 25	63081	
		Circular	Female connector G ¹ / ₂ B	Steel	PN 25	63154	

Accessories for pressure gauges

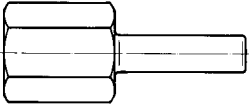
DG: E

Reducers and adapters					
	Female connector	Male connector	Material	Part no.	Price €
	G ¹ / ₈	G ¹ / ₄	Brass	63050	
	G ¹ / ₄	G ¹ / ₈	Brass	63052	
	G ¹ / ₄	G ³ / ₈	Brass	63053	
	G ¹ / ₄	G ¹ / ₂	Brass	63054	
	G ¹ / ₄	G ¹ / ₂	1.4571	63051	
	G ³ / ₈	G ¹ / ₄	Brass	63056	
	G ³ / ₈	G ¹ / ₂	Brass	63057	
	G ¹ / ₂	G ¹ / ₄	Brass	63058	
	G ¹ / ₂	G ³ / ₈	Brass	63059	
	G ¹ / ₂	M 20 x 1.5	Brass	63155	
	M 20 x 1.5	G ¹ / ₂	Brass	63156	
	Female connector	Female connector	Material	Part no.	Price €
	G ¹ / ₄	G ¹ / ₈	Brass	63158	
	G ¹ / ₄	G ¹ / ₄	Brass	63159	
	G ¹ / ₂	G ¹ / ₄	Brass	63160	
	G ¹ / ₂	G ¹ / ₂	Brass	63161	
	Male connector	Male connector	Material	Part no.	Price €
	G ¹ / ₂	G ¹ / ₂	Brass	63164	
	G ¹ / ₂	G ¹ / ₂	1.4571	63165	
Connection nipple - self-sealing					
	Female connector	Male connector	Material	Part no.	Price €
	G ¹ / ₈	G ¹ / ₄	Brass	63067	
	G ¹ / ₄	G ³ / ₈	Brass	63068	
	G ¹ / ₄	G ¹ / ₂	Brass	63069	
	G ³ / ₈	G ¹ / ₂	Brass	63065	
Mounting valve with self-sealing coating - closes automatically when the pressure gauge is replaced					
	Female connector	Male connector	Material	Part no.	Price €
	G ¹ / ₄	G ¹ / ₄	Brass	77907	
	G ¹ / ₄	G ³ / ₈	Brass	77908	
	G ³ / ₈	G ³ / ₈	Brass	77917	
	G ¹ / ₄	G ¹ / ₂	Brass	77914	
	G ³ / ₈	G ¹ / ₂	Brass	77918	

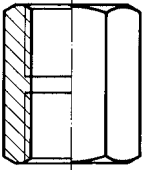
Accessories for pressure gauges

DG: E

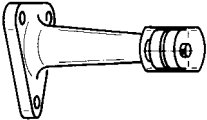
Union nut + nipple DIN 16284

	Female connector	Nipple	Material	Part no.	Price €
	G ¹ / ₄	6 mm	Brass	63072	
	G ¹ / ₂	12 mm	Brass	63084	
	G ¹ / ₂	12 mm	1.4571	63070	

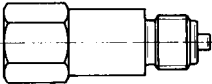
Female/female connector DIN 16283

	Female connector	Female connector	Material	Part no.	Price €
	G ¹ / ₄ left	G ¹ / ₄	Brass	63101	
	G ¹ / ₄ left	G ¹ / ₄	Steel	63102	
	G ¹ / ₄ left	G ¹ / ₄	1.4571	63103	
	G ¹ / ₂ left	G ¹ / ₂	Brass	63104	
	G ¹ / ₂ left	G ¹ / ₂	Steel	63105	
	G ¹ / ₂ left	G ¹ / ₂	1.4571	63106	

Gauge bracket DIN 16281 - design H

	Female connector	Protrusion	Material	Part no.	Price €
	26 mm	60 mm	Aluminium	63077	
	26 mm	100 mm	Aluminium	63078	
	26 mm	160 mm	Aluminium	63079	
	26 mm	100 mm	1.4571	63080	

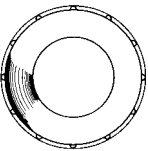
Adapter DIN 16281

	Female connector	Male connector	Material	Part no.	Price €
	G ¹ / ₂	G ¹ / ₂	Brass	63095	
	G ¹ / ₂	G ¹ / ₂	Steel	63097	
	G ¹ / ₂	G ¹ / ₂	1.4571	63096	

Seals

	Design	For thread	Material	Part no.	Price €
	Profile seal for internal centering	G ¹ / ₄ M 12 x 1.5	Copper	39205	
	Profile seal for internal centering	G ¹ / ₂ M 20 x 1.5	Copper	39206	
	Flat gasket DIN 16258	G ¹ / ₄ M 12 x 1.5	Copper	39209	
	Flat gasket DIN 16258	G ¹ / ₂ M 20 x 1.5	Copper	39210	
	Flat gasket DIN 16258	G ¹ / ₂ M 20 x 1.5	1.4571	39211	
	Flat gasket DIN 16258	G ¹ / ₂ M 20 x 1.5	PTFE	39212	

Protective covers

	Nominal size*	Colour*	Material	Part no.	Price €
	63	blue	Rubber	63029	
	63	red	Rubber	63100	
	63	black	Rubber	63019	
	80	black	Rubber	63071	
	100	black	Rubber	63030	

* Other nominal sizes and colours on request.

Diaphragm seals



Application

Diaphragm seals are devices with a separating diaphragm which are used to separate the measuring unit from the medium to be measured. They extend the application ranges of pressure gauges, pressure switches and pressure transducers.

Diaphragm seals are used for the following:

- Where the medium to be measured must not come into contact with the measuring element, for example: the medium is polluted or highly viscous, crystallizes or hardens.
- The medium is corrosive and special corrosion resistant materials would have to be used for Bourdon tubes, which is not always possible.
- The ambient temperatures at the measuring point or the temperature of the medium are extremely high.
- For hygienic reasons, there must be no „dead“ space.
- The site conditions do not allow for direct installation of a pressure gauge.

Principle of operation

Diaphragm seals are used in conjunction with Bourdon tube pressure gauges, pressure transducers or pressure switches. They are either mounted directly on to the measuring instrument or connected via a cooling element or a capillary tube.

The separating element is the main component of a diaphragm seal. It consists of either a diaphragm, a pipe or an immersion shaft. The diaphragm type is the most commonly used diaphragm seals.

It is always a sealed system in which the volume between the separating element and the measuring gauge (end of Bourdon tube) is first evacuated and then filled with a pressure transmission liquid.

The medium to be measured is in contact with the separating element and causes it to bend which in turn causes a displacement of the volume within the system.

The element must have a displacement capacity which is sufficient to move the measuring element of the associated gauge. The deflection must always take place in the elastic area of the separating diaphragm. This is determined by the diameter, the material and the shape.

Temperature performance

The system is filled at ambient room temperature. Different temperatures will change the volume of the filling liquid causing differences in pressure readings. By specifying the exact operating temperatures at the time of order, we can counteract this effect by selecting the most suitable filling liquid. If the temperatures are higher than +100 °C, the gauge and the diaphragm seal at the measuring point should be separated by a capillary tube or the system should be equipped with a cooling element.

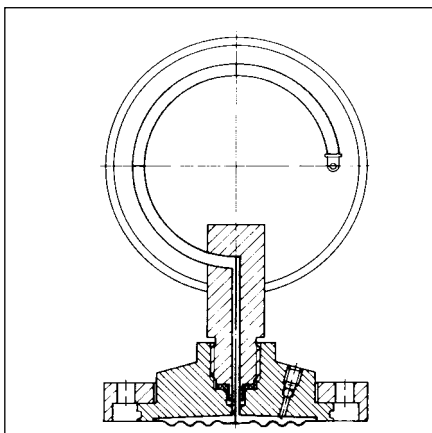
Response time

Using a diaphragm seal will generally result in a slightly delayed response of the pressure gauge. This effect can be useful for system damping purposes.

Filling liquid

The filling liquid for the diaphragm seal must be selected according to the minimum and maximum operating temperatures. Furthermore, the filling liquid must be compatible with the medium to be measured as it cannot be ruled out that they may come into contact with each other, when a diaphragm seal is damaged.

Diaphragm seals plastic version/compact version



Type MD 10

Application

For use with Bourdon tube pressure gauges or pressure switches. Especially designed for polluted waste water, fertilizers, corrosive media.

Technical specifications

Process connection

PVC, PP, PVDF
Female thread G¹/₂ or G¹/₄

Diaphragm

EPDM, PTFE-coated
internal

Instrument connection

Female thread G¹/₂ or G¹/₄

Screws and nuts

Stainless steel

Pressure ranges

Refer to price list section

Operating temperature range

PVC, PP -10 °C/+40 °C
PVDF -10 °C/+50 °C

Options

- Other process connections
- Other materials

Refer to page 404 for part no.

Plastic version type MD 10



Type MD 20

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For abrasive and polluted media. Specially for the concrete and paint spray industries.

Technical specifications

Process connection

Stainless steel 1.4571 (316 Ti)
G¹/₂B, fixed thread

Diaphragm

NBR, crimped in

Instrument connection

Stainless steel 1.4571 (316 Ti)
Female thread G¹/₄

Filling liquid

Glycerine

Pressure ranges

Refer to price list section

Nominal pressure

PN 60

Operating temperature range

-10 °C/+60 °C

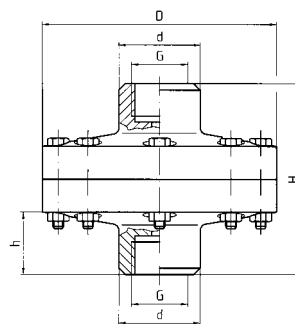
Options

- Capillary tube
- Other threads
- Other materials

Compact version type MD 20

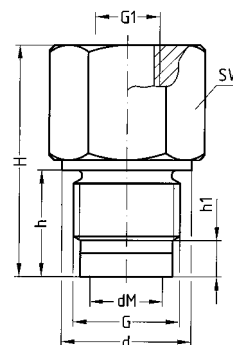


Dimensions (in mm) type MD 10



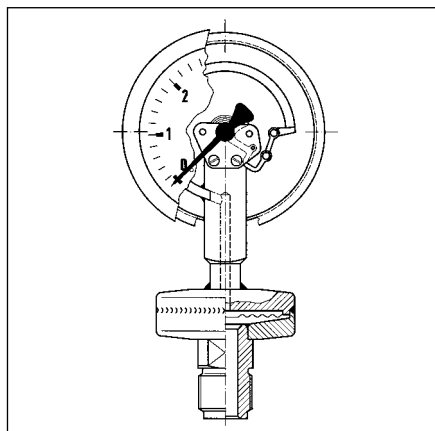
G	d	D	h	H
G ¹ / ₄	25	72	15	71
G ¹ / ₂	32	100	22	90

Dimensions (in mm) type MD 20



G	G1	d	dM	h	h1	H	SW
G ¹ / ₂ B	G ¹ / ₄	26	13.5	21	7	46	27

Diaphragm seals, compact version



Compact version type MD 21



Compact version type MD 22



Type MD 21

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches.

For corrosive, hot and polluted media at high pressures. Especially for use in the machinery and chemical industries.

Options

- Adapter for instrument connection G¹/₄/G¹/₂
- Cooling element (> 100 °C)
- Capillary tube
- Other threads
- Other materials

Instrument connection

Welded connection

Filling liquid

Glycerine

Pressure ranges

Refer to price list section

Nominal pressure

PN 40 to 250

Technical specifications

Process connection

Stainless steel 1.4571 (316 Ti)
G¹/₂B to G2B, fixed thread

Diaphragm

Stainless steel 1.4571 (316 Ti)
flush mounting, welded flush to upper body

Instrument connection

Welded connection

Filling liquid

Glycerine

Pressure ranges

Refer to price list section

Nominal pressure

PN 600 to 1000

Type MD 22

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches.

For corrosive, hot and polluted media at high pressures. Especially for use in the machinery and chemical industries.

Options

- Adapter for instrument connection G¹/₄/G¹/₂
- Cooling element (> 100 °C)
- Capillary tube
- Other threads
- Other materials
- Other filling liquids

Technical specifications

Process connection

Stainless steel 1.4571 (316 Ti)
G¹/₂B, fixed thread

Upper and lower part

Stainless steel 1.4571 (316 Ti)
welded

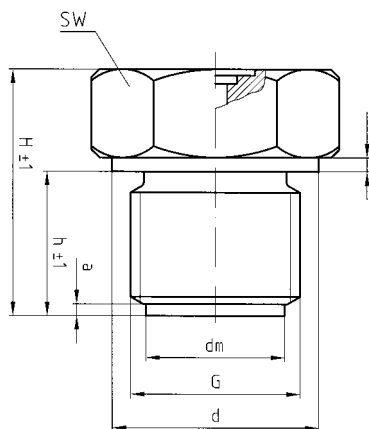
Diaphragm

Stainless steel 1.4571 (316 Ti)
internal, welded

Diaphragm seals, compact version

Types and dimensions (mm)

Type MD 21



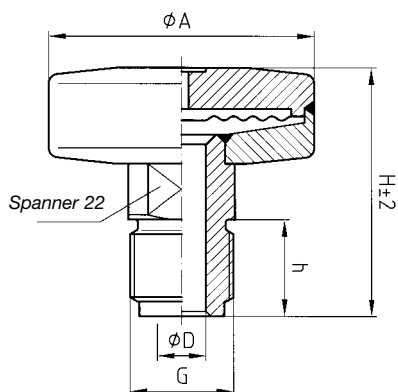
Pipe thread according to ISO 228-1

G	d	dm	h	H	a	b	SW
G $\frac{1}{2}$ B	26	17.2	17	33.5	3	3	27
G $\frac{3}{4}$ B	32	23.5	19	34	3	3	32
G1B	39	28	21	36	3	3	41
G1 $\frac{1}{2}$ B	55	40	25	48	3	3	55
G2B	68	50	27	56	3	3.5	70

Pipe thread according to ANSI/ASME B1.20.1

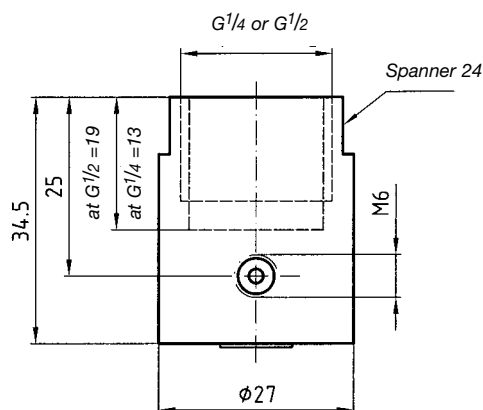
G	d	dm	h	H	a	b	SW
1"NPT	-	23.5	24	36	-	-	41
1 $\frac{1}{2}$ "NPT	-	35	25	45	-	-	55
2"NPT	-	48	26	50	-	-	70

Type MD 22

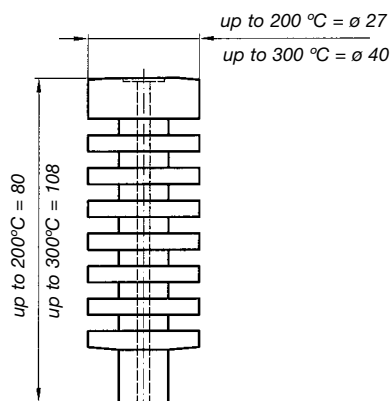


PN	G	ØA	ØD	h	H
40	G $\frac{1}{4}$ B	55	6	13	44.5
40	G $\frac{3}{8}$ B	55	6	16	47.5
40	G $\frac{1}{2}$ B	55	10	20	51.5
40	1/4"NPT	55	6	15	46.5
40	1/2"NPT	55	10	20	51.5
250	G $\frac{1}{4}$ B	40	6	13	44.5
250	G $\frac{3}{8}$ B	40	6	16	47.5
250	G $\frac{1}{2}$ B	40	10	20	51.5
250	1/4"NPT	40	6	15	46.5
250	1/2"NPT	40	10	20	51.5

Adapter for instrument connection G $\frac{1}{4}$ /G $\frac{1}{2}$ with filling port

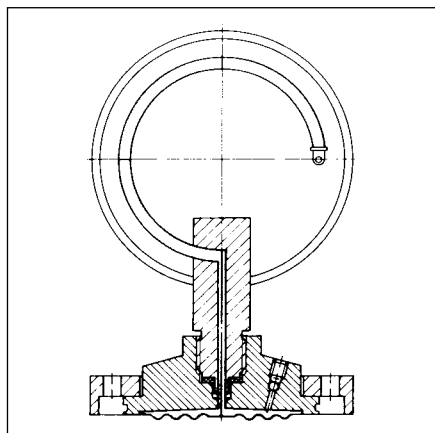


Cooling element, can be welded at both ends



Diaphragm seals, standard version

Thread connection - type MD 30



Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches.
For corrosive, viscous, polluted or hot media.

Technical specifications

Process connection/lower part

Stainless steel 1.4571 (316 Ti)
G $\frac{1}{2}$ B or $\frac{1}{2}$ NPT
Female or male thread

Diaphragm

Stainless steel 1.4435 (316 L)

Seal

Viton (FPM)

Instrument connection/upper part

Stainless steel 1.4435 (316 L)
Welded connection

Retaining flanges

Stainless steel 1.4571 (316 Ti)

Spacer ring

Stainless steel 1.4571 (316 Ti)

Screws and nuts

Stainless steel A2

Filling liquid

Silicone oil

Pressure ranges

Refer to price list section

Nominal pressure

PN 25 to 250

Options

Process connection/lower part

- Special materials/coatings
- Other connection threads

Diaphragm

- Special materials/coatings

Seal

- Other materials

Instrument connection/upper part

- Adapter for instrument connection G $\frac{1}{4}$ /G $\frac{1}{2}$
- Cooling element (> 100 °C)
- Capillary tube

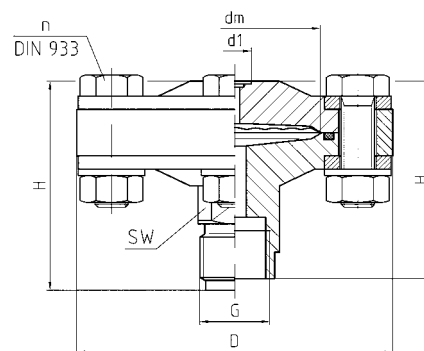
Screws/nuts/spacer ring

- Other materials

Miscellaneous

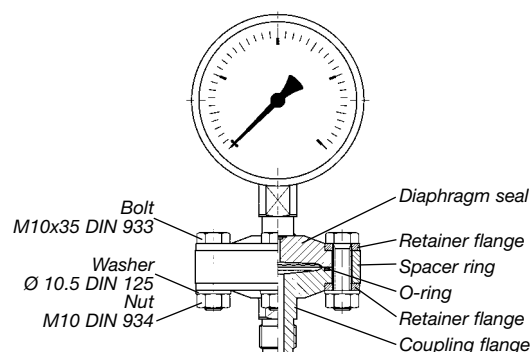
- Other filling liquids

Dimensions (in mm)

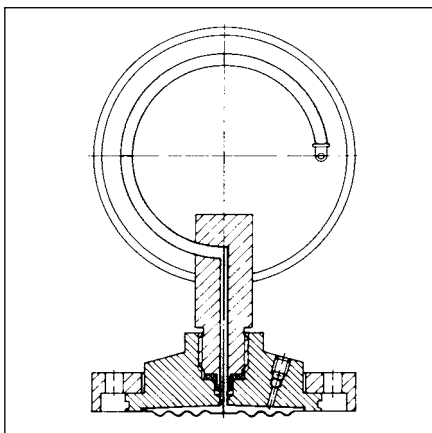


G	d1	PN	dm	D	H	n	SW
G $\frac{1}{2}$	10	25	36	95	60	4xM10	22
G $\frac{1}{2}$ B	10	25	36	95	63	4xM10	22
$\frac{1}{2}$ -14NPT	10	25	36	95	63	4xM10	22
G $\frac{1}{2}$	10	100	36	95	60	4xM10	22
G $\frac{1}{2}$ B	10	100	36	95	63	4xM10	22
$\frac{1}{2}$ -14NPT	10	100	36	95	63	4xM10	22
G $\frac{1}{2}$	10	250	56	95	56	8xM10	22
G $\frac{1}{2}$ B	10	250	56	95	79	8xM10	22
$\frac{1}{2}$ -14NPT	10	250	56	95	76	8xM10	22

Mounting example



Diaphragm seal for the paper and pulp industries - type MD 40



Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches.
 For corrosive, highly viscous, polluted or media which tend to harden. Especially designed for use in the paper, pulp and lacquer industries.

Technical specifications

Process connection/tubus

Stainless steel 1.4571(316 Ti), DN 48
 loose retaining flange,
 stainless steel 1.4301 (304)

Diaphragm

Stainless steel 1.4571 (316 Ti)

Seal

„Perbunan“ nitrile rubber

Instrument connection

Stainless steel 1.4571 (316 Ti)
 Welded connection

Filling liquid

Glycerine

Pressure ranges

Refer to price list section

Nominal pressure

PN 40

Accessories

Screws M 6 x 20, galvanized steel
 Seal „Perbunan“ nitrile rubber
 59 x 48 x 2 mm
 (included in scope of delivery)

Options

Process connection/tubus

- Extended tubus 17 mm (also suitable for O-ring seal)
- Special materials
- Silicone-free

Diaphragm

- Special materials

Instrument connection

- Adapter for instrument connection G¹/₄/G¹/₂
- Cooling element (> 100 °C)
- Capillary tube

Miscellaneous

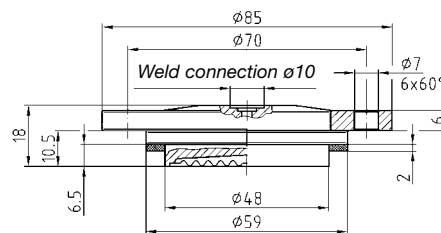
- Other filling liquids

Mounting accessories

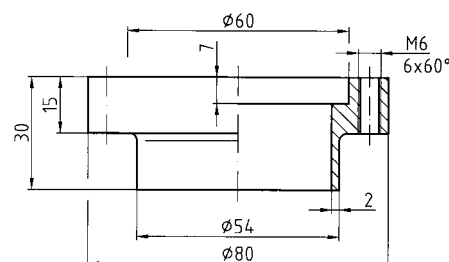
- Welding flange stainless steel 1.4301 (304)

Dimensions (in mm)

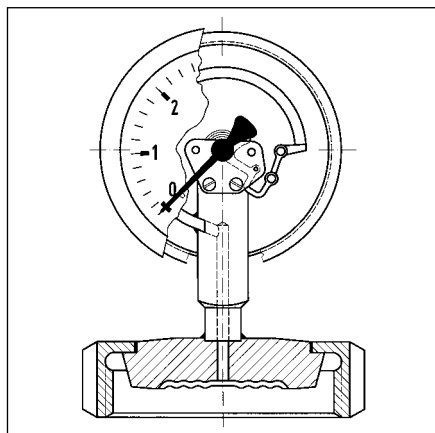
MD 40



Welding flange (optional)



Diaphragm seals for hygienic applications



Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For viscous, perishable or hot media. Especially designed for applications in the food, beverage, pharmaceutical, chemical and biotech industries.

Type summary/ process connections

Type MD 50: DIN 11851/11887

Type MD 51: SMS 1147

Type MD 52: Hygienic DIN 11864

Type MD 53: APV-RJT

Type MD 54: IDF

Type MD 55: APV-ISS

Type MD 60: Clamp ISO 2852

Type MD 61: Clamp DIN 32676

Type MD 62: Tri-Clamp

Refer to table on page 397 for nominal diameters.

Technical specifications MD 50 - MD 55

Process connection

Stainless steel 1.4435 (316 L)
Male or female thread
(grooved union nut stainless steel 1.4301/304)

Diaphragm

Stainless steel 1.4435 (316 L),
welded flush to upper body

Instrument connection

Welded connection

Filling liquid

Vegetable oil, food quality

Pressure ranges

Refer to price list section

Nominal pressure

PN 25 to 40

Options

- Adapter for instrument connection G¹/₄/G¹/₂
- Special materials/coatings
- Electrolytically polished
- Cooling element (> 100 °C)
- Capillary tube
- Other filling liquids

Technical specifications MD 60 - MD 62

Process connection

Stainless steel 1.4435 (316 L)
Clamp 3/4" to 3"

Diaphragm

Stainless steel 1.4435 (316 L),
welded flush to upper body

Instrument connection

Welded connection

Filling liquid

Vegetable oil, food quality

Pressure ranges

Refer to price list section

Nominal pressure

PN 25 to 40

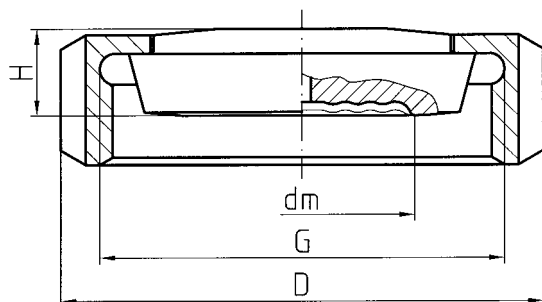
Options

- Adapter for instrument connection G¹/₄/G¹/₂
- Special materials/coatings
- Electrolytically polished
- Cooling element (> 100 °C)
- Capillary tube
- Other filling liquids (FDA-approved)
- Accessories (retainer ring, seal, socket)

Diaphragm seals for hygienic applications

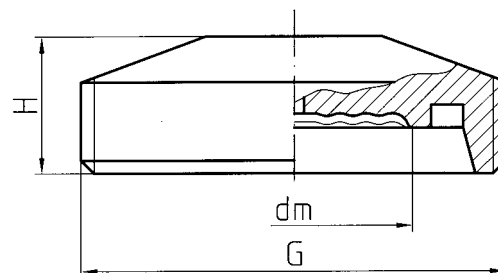
Types and dimensions (mm)

Grooved union nut*



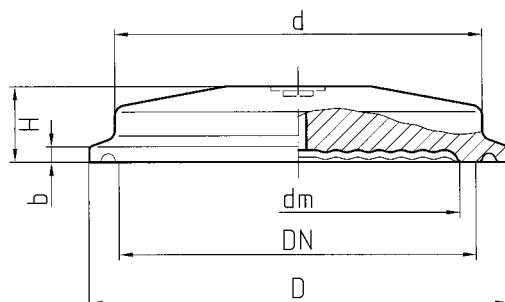
Version	DN	PN	dm	G	D	H
DIN 11851	25	40	23.5	Rd52 x 1/6	63	14
	32	40	28	Rd58 x 1/6	70	14
	40	40	36	Rd65 x 1/6	78	14
	50	25	48	Rd78 x 1/6	92	15
	65	25	-	Rd95 x 1/6	112	-
SMS norm	1 1/2"	40	36	Rd60 x 1/6	74	14
	2"	40	48	Rd70 x 1/6	84	14
	2 1/2"	25	-	Rd85 x 1/6	100	-

Threaded socket*



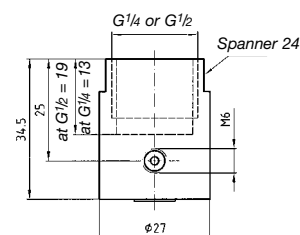
Version	DN	PN	dm	G	H
DIN 11851	25	40	23.5	Rd52 x 1/6	21
	32	40	28	Rd58 x 1/6	21
	40	40	36	Rd65 x 1/6	21
	50	25	48	Rd78 x 1/6	21
	65	25	-	Rd95 x 1/6	-
SMS norm	1 1/2"	40	36	Rd60 x 1/6	17
	2"	40	48	Rd70 x 1/6	17
	2 1/2"	25	-	Rd85 x 1/6	-

Clamp connection ISO 2852

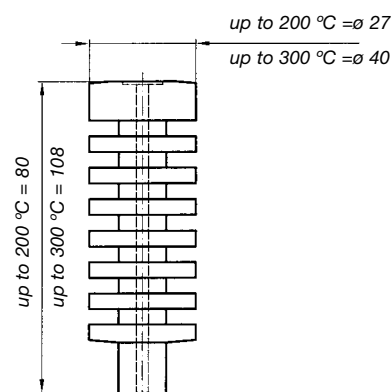


DN	PN	D	dm	d	H	b
3/4"	40	25	17.2	19	20	3.6
1"	40	50.5	26	42	28	2.85
1 1/2"	40	50.5	36	42	28	2.85
2"	40	64	48	55	28	2.85
2 1/2"	25	77.5	59	68	28	2.85
3"	25	91	72	81	28	2.85

Adapter for instrument connection G1/4/G1/2 with filling hole



Cooling element, can be welded at both ends



* Fig. shows connection DIN 11851

Diaphragm seals for homogenising machines/ tongue type diaphragm seals

Homogenising machine version
type MD 70



Type MD 70

Application

For use with Bourdon tube pressure gauges. For highly viscous media at high pressures. Especially for homogenising machines.

Technical specifications

Process connection

Stainless steel 1.4404 (316 L)
loose retaining flange, stainless steel

Diaphragm

Stainless steel 1.4404 (316 L),
welded flush to upper body

Instrument connection

Stainless steel 1.4404 (316 L)
Welded connection

Filling liquid

Glycerine

Pressure ranges

Refer to price list section

Nominal pressure

PN 600

Options

- Nominal pressure PN 1600
- Other filling liquids

Tongue type diaphragm seal
type MD 71 with fixed thread



Type MD 71

Application

For use with Bourdon tube pressure gauges. For flowing and heterogeneous media at high pressure.

Technical specifications

Process connection

Stainless steel 1.4571 (316 Ti)
G $\frac{1}{2}$ B or G $\frac{3}{4}$ B

Diaphragm/pressure sensor

Corrugated diaphragm pipe with
star-shaped cross section
Stainless steel 1.4571 (316 Ti),
welded to upper body

Instrument connection

Stainless steel 1.4571 (316 Ti)
Female thread G $\frac{1}{2}$

Filling liquid

Silicone oil

Pressure ranges

Refer to price list section

Nominal pressure

PN 1000

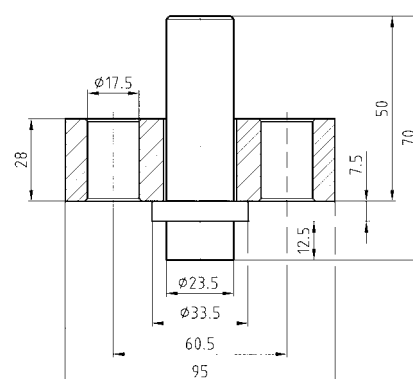
Options

- Other process connections
- Connection with union nut
- Other filling liquids

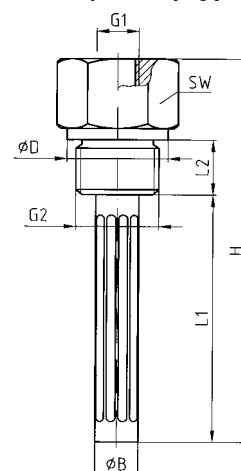
Tongue type diaphragm seal
type MD 71 with union nut (optional)



Dimensions (in mm) type MD 70

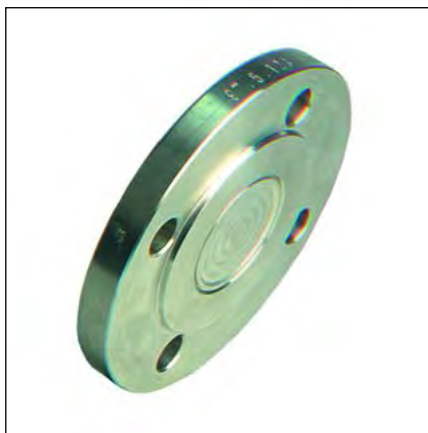
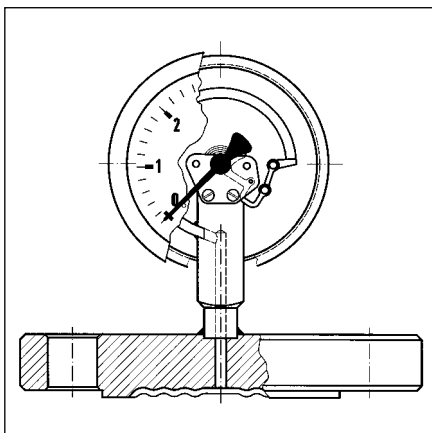


Dimensions (in mm) type MD 71



G1	G2	SW	Ø D	L1	L2	B	H
G $\frac{1}{2}$	G $\frac{1}{2}$ B	27	26	82	14	15	118
G $\frac{1}{2}$	G $\frac{3}{4}$ B	32	32	82	16	15	118
G $\frac{1}{2}$	$\frac{1}{2}$ -14 NPT	27	26	82	18	15	120

Diaphragm seals, flange version - type MD 80



Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches.
 For corrosive, highly viscous, polluted, perishable, crystallising and hot media.

Pressure ranges

Refer to price list section

Nominal pressure

PN 16 to 40
 Class 150 to 300

Miscellaneous

- Adapter for instrument connection G¹/₄/G¹/₂
- Cooling element (> 100 °C)
- Capillary tube (back or bottom)
- Other filling liquids
- Customer-specific flanges
- Other nominal diameters

Technical specifications

Process connection

Stainless steel 316 L,
 flange connection according to
 EN 1092-1 design B 1
 DN 25 to 120 or ASME B 16.5
 DN 1" up to 4"

Diaphragm

Stainless steel 316 L

Instrument connection

Welded connection

Filling liquid

Silicone oil

Options

Process connection

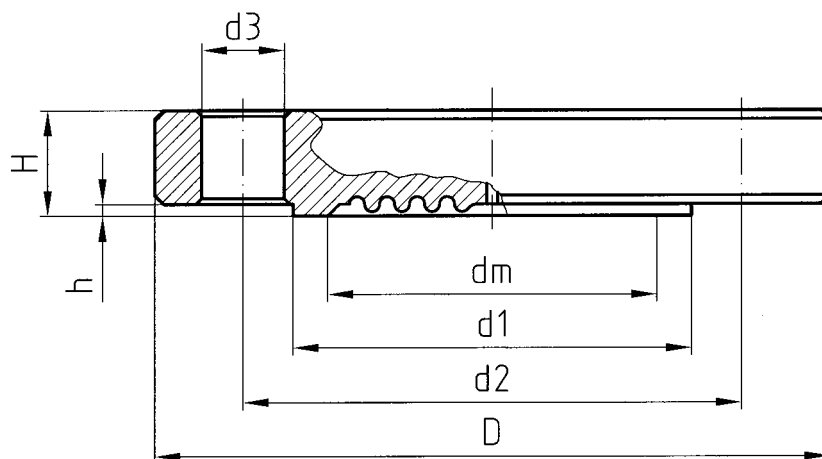
- Special materials/coatings
- Other sealing surfaces

Diaphragm

- Special materials:
 Hastelloy, Monel, Nickel, Inconel,
 Incoloy, Platinum, Titanium,
 Tantalum, Zirconium
- Coatings/linings:
 PFA (up to 200 °C),
 ECTFE (up to 150 °C),
 PTFE (up to 150 °C, up to 100 bar),
 silver (up to 150 °C),
 gold (up to 200 °C)

Diaphragm seals, flange version - type MD 80

Types and dimensions (mm)



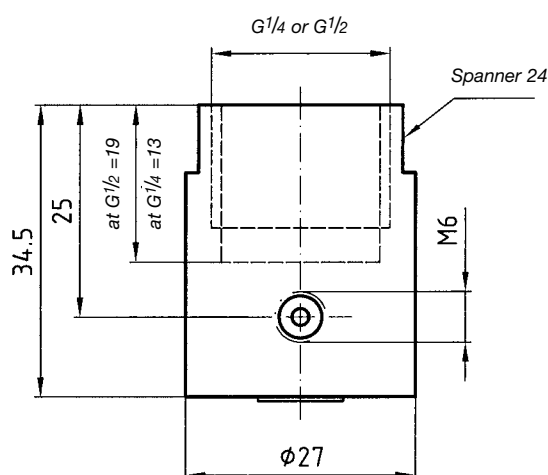
Flange connection according to EN 1092-1 design B 1

DN	PN	D	d1	d2	d3	H	h	dm
25	40	115	68	85	4x14	18	-	30
40	40	150	88	110	4x18	18	3	48
50	40	165	102	125	4x18	18	3	59
80	40	200	138	160	8x18	24	3	89
100	40	235	162	190	8x22	24	3	89

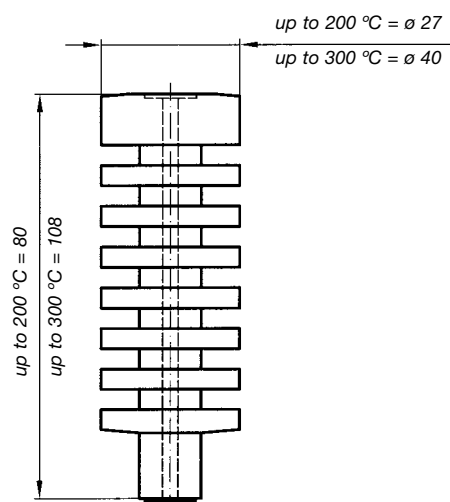
Flange connection according to ASME B 16.5

DN	CL	D	d1	d2	d3	H	h	dm
1"	150	108	50.8	79.4	4x15.9	14.3	1.6	30
	300	123.9	50.8	88.9	4x19.1	17.5	1.6	30
1 1/2"	150	127	73.2	98.6	4x15.9	17.5	1.6	48
	300	155.6	73.2	114.3	4x22.4	22.4	1.6	48
2"	150	152.4	92.1	120.7	4x19.1	19.1	1.6	59
	300	165.1	92.1	127	8x19.1	25.4	1.6	59
3"	150	190.5	127	152.4	4x19.1	23.9	1.6	89
	300	209.6	127	168.3	8x22.4	31.8	1.6	89
4"	150	228.6	157.2	190.5	8x19.1	23.9	1.6	89
	300	254	157.2	200.1	8x22.3	31.7	1.6	89

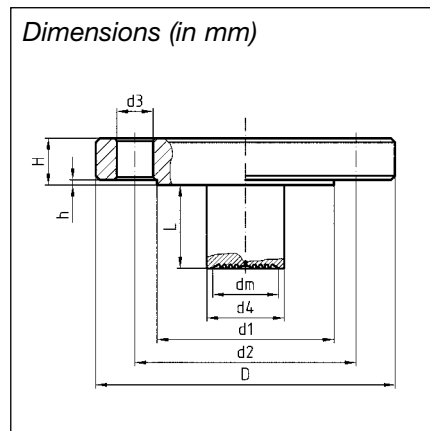
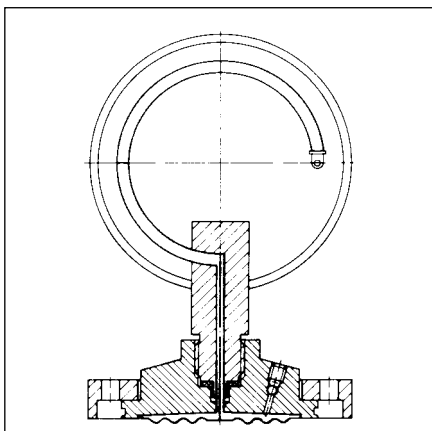
Adapter for instrument connection G1/4/G1/2 with filling hole



Cooling element, can be welded at both ends



Diaphragm seals „tubus“-flange version - type MD 81



Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, highly viscous, polluted, perishable, crystallising and hot media. Especially designed for use on insulated vessels or tanks with thick walls.

Technical specifications

Process connection

Stainless steel 316 L,
 flange connection according to
 EN 1092-1 design B 1
 DN 50 to 100 or ASME B 16.5
 DN 1" up to 4"
 „tubus“ lengths 50, 100, 150 mm

Diaphragm/sealing surface

Stainless steel 316 L, welded

Instrument connection

Stainless steel 316 L,
 welded connection

Filling liquid

Silicone oil

Pressure ranges

Refer to price list section

Nominal pressure

PN 16 to 40
 Class 150 to 300

Options

Process connection

- Other „tubus“ lengths
- Special materials/coatings
- Other sealing surfaces

Diaphragm

- Special materials:
 Hastelloy, Monel, Nickel, Inconel, Incoloy, Platinum, Titanium, Tantalum, Zirconium
- Coatings/linings:
 PFA (up to 200 °C),
 ECTFE (up to 150 °C),
 PTFE (up to 150 °C, up to 100 bar),
 silver (up to 150 °C),
 gold (up to 200 °C)

Miscellaneous

- Adapter for instrument connection G¹/₄/G¹/₂
- Capillary tube (back or bottom)
- Cooling element (> 100 °C)
- Other filling liquids
- Customer-specific flanges
- Other nominal diameters

Flange connection according to EN 1092-1 design B 1

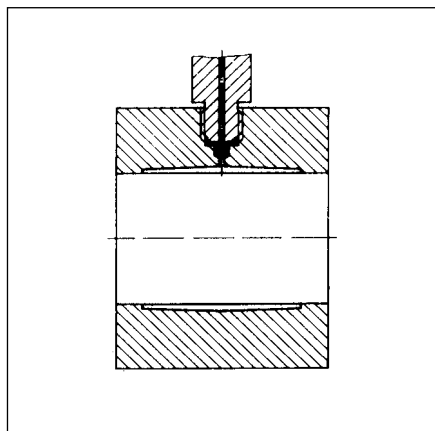
DN	PN	D	d1	d2	d3	d4	H	h	dm	L
50	40	165	102	125	4x18	48	20	3	48	50, 100, 150
80	40	200	138	160	8x18	76	24	3	75	
100	40	235	162	190	8x22	94	24	3	93	

Flange connection according to ASME B 16.5

DN	CL	D	d1	d2	d3	d4	H	h	dm	L
1"	150	108	51	79.5	4x16	25	14.5	1.5	27	50, 100, 150
2"	150	152	92	121	4x19	48	19	1.5	48	
3"	150	190	127	152	4x19	76	24	1.5	75	

In-line chemical seals for hygienic processes

In-line chemical seals with clamp connection



Threaded socket type RD 50



Clamp connection type RD 60



Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For flowing, corrosive and highly viscous media; designed for direct installation in pipes. Especially designed and suitable for applications in the bio-chemical, food, beverage and pharmaceutical industries.

Technical specifications

Process connection

Type RD 50 DIN 11851, 1.4404 (316 L), male thread DN 15 to DN 100, type RD 51 SMS, 1.4404 (316 L), 1" to 3", type RD 60 Clamp ISO 2852, 1.4404 (316 L) 1/2" to 3"

Diaphragm

Stainless steel 316 L, welded flush to body

Instrument connection

Stainless steel 1.4404 (316 L)
Welded connection

Filling liquid

Vegetable oil, food quality

Pressure ranges

Refer to price list section

Nominal pressure

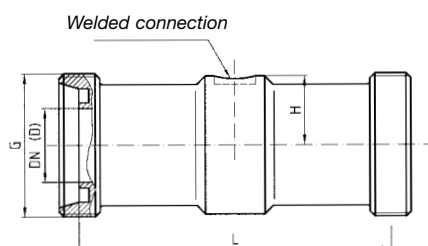
PN 40

Options

- Coatings
- Cooling element (> 100 °C)
- Capillary tube
- Other filling liquids

Dimensions (in mm)

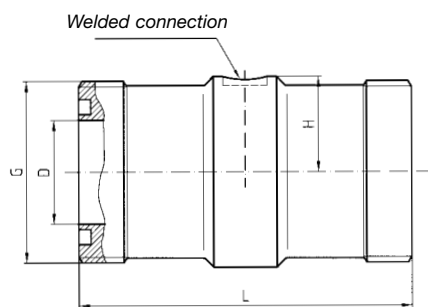
Type RD 50 DIN 11851/DIN 11887



DIN 11851/DIN 11887

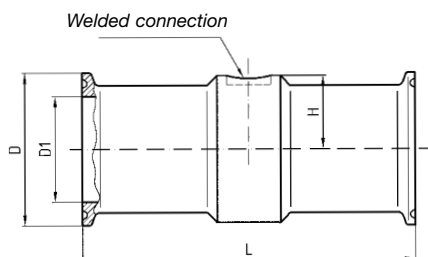
DN	PN	G	L	D	H
15	40	Rd34x1/8	240	16	20
25	40	Rd52x1/6	110	26	24
32	40	Rd58x1/6	110	32	29
40	40	Rd65x1/6	110	38	31.5
50	25	Rd78x1/6	110	50	37
65	25	Rd95x1/6	110	66	45
80	25	Rd110x1/4	60	81	51.5
100	25	Rd130x1/4	60	100	64

Type RD 51 SMS norm



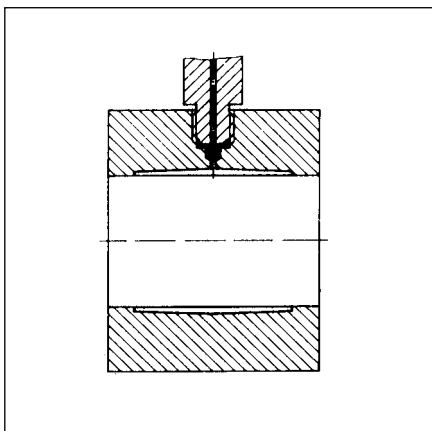
DN	PN	G	L	D	H
1" (DN25)	40	Rd40x1/6	110	22.2	24
1 1/2" (DN38)	40	Rd60x1/6	110	34.8	31.5
2" (DN51)	25	Rd70x1/6	110	47.8	37
2 1/2" (DN63.5)	25	Rd85x1/6	110	60.3	45
3" (DN76)	25	Rd98x1/6	60	72.9	51.5

Type RD 60 Clamp ISO 2852



DN	PN	D	D1	L	H
1"	40	50.5	22.2	110	24
1 1/2"	40	50.5	34.8	110	31.5
2"	25	64	47.8	110	37
2 1/2"	25	77.5	60.3	110	45
3"	25	91	72.9	60	51.5

In-line chemical seal, intermediate flange version - type RD 80



Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches.

For flowing, corrosive and highly viscous media; designed for direct installation in pipes.

Technical specifications

Process connection

Stainless steel 1.4404 (316 L), for flanges according to EN 1092-1 design B 2, DN 25 to DN 100 or ASME B 16.5, 1" to 4"

Diaphragm

Stainless steel 1.4404 (316 L), welded flush to body

Instrument connection

Stainless steel 1.4404 (316 L)
 Female thread G1/2

Filling liquid

Silicone oil

Pressure ranges

Refer to price list section

Nominal pressure

PN 4 to 400
 Class 150 to 6,000

Options

- Coatings
- Cooling element (> 80 °C)
- Capillary tube
- Other filling liquids

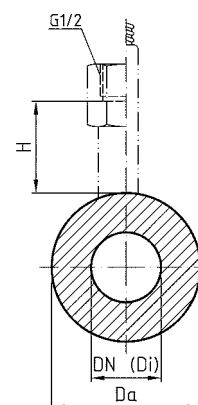
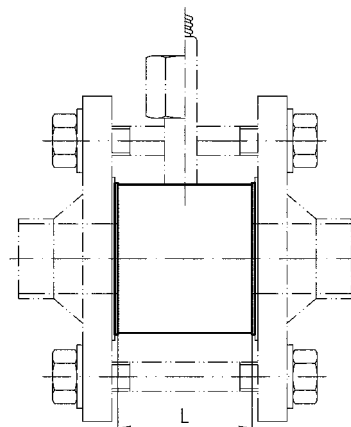
Dimensions (in mm)

Flange connection according to EN 1092-1 design B 2

DN	Di	PN	Da	L	H
25	28.5	4-400	68	100	29
40	43.1	4-400	88	100	29
50	54.5	4-400	100	100	29
65	70.3	4-400	120	100	29
80	82.5	4-400	138	60	29
100	107.1	4-400	160	60	29

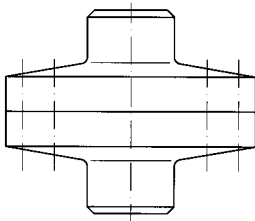
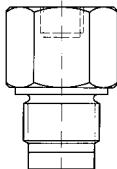
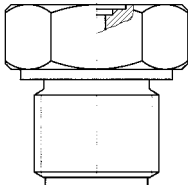
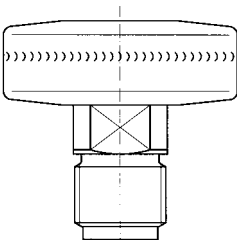
Flange connection according to ASME B 16.5

DN	Di	PN	Da	L	H
1"	28.5	150-6,000	50	100	29
1 1/2"	43.1	150-6,000	73.2	100	29
2"	54.5	150-6,000	91.9	100	29
3"	82.5	150-6,000	127	60	29
4"	107.1	150-6,000	157.2	60	29



Diaphragm seals, types MD 10/20/21/22

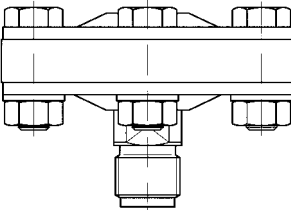
DG: M

	MD 10 plastic version Diaphragm PTFE-coated, PN 10 (PVDF PN 16)									
	Diaphragm seal body	Process connection	Instrument connection	Minimum meas. range* (in bar) at nominal size				Part no.	Price €	
				63	100	160	DMU			
	PVC	G ¹ / ₄	G ¹ / ₄	1.6	1.6	1.6	---	31411		
	PVC	G ¹ / ₂	G ¹ / ₂	1.6	1.6	1.6	---	31412		
	PP	G ¹ / ₄	G ¹ / ₄	1.6	1.6	1.6	---	31900		
	PP	G ¹ / ₂	G ¹ / ₂	1.6	1.6	1.6	---	31901		
	PVDF	G ¹ / ₄	G ¹ / ₄	4	4	4	---	31902		
	PVDF	G ¹ / ₂	G ¹ / ₂	4	4	4	---	31903		
	MD 20 compact version Diaphragm, crimped in, PN 60									
	Diaphragm material	Process connection	Instrument connection	Minimum meas. range* (in bar) at nominal size				Part no.	Price €	
				63	100	160	DMU			
	NBR	G ¹ / ₂ B	G ¹ / ₄	10	---	---	---	31413		
	MD 21 compact version Diaphragm stainless steel 1.4571, welded									
	Nominal pressure	Process connection	Instrument connection	Minimum meas. range* (in bar) at nominal size				Part no.	Price €	
				63	100	160	DMU			
	PN 600	G ¹ / ₂ B	welded	10	100	100	1	31415W		
	PN 1,000	G ³ / ₄ B	welded	4	100	100	1	31416W		
	PN 1,000	G1B	welded	4	4	4	1	31328W		
	PN 600	G1 ¹ / ₂ B	welded	0.6	1.6	1.6	0.6	31329W		
	PN 600	G2B	welded	0.6	0.6	0.6	0.6	31330W	on request	
	MD 22 compact version Diaphragm stainless steel 1.4571, internal, welded									
	Nominal pressure	Process connection	Instrument connection	Minimum meas. range* (in bar) at nominal size				Part no.	Price €	
				63	100	160	DMU			
	PN 40	G ¹ / ₄ B	welded	0.6	0.6	0.6	0.6	31997W		
	PN 40	G ¹ / ₂ B	welded	0.6	0.6	0.6	0.6	31998W		
	PN 40	1/2-14 NPT	welded	0.6	0.6	0.6	0.6	31999W		
	PN 250	G ¹ / ₄ B	welded	4	4	4	4	32000W		
	PN 250	G ¹ / ₂ B	welded	4	4	4	4	32001W		
	PN 250	1/2-14 NPT	welded	4	4	4	4	32002W		

* Valid for standard filling liquid, direct mounting (without capillary tube) and at a room and medium temperature of 20 °C.

Diaphragm seals, types MD 30/40

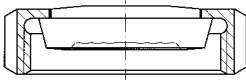
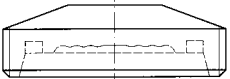
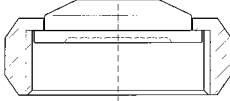
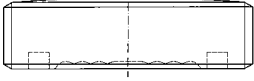
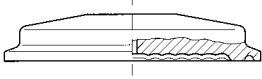
DG: M

	MD 30 standard version							
	Nominal pressure	Process connection	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	PN 25	Stainless steel 1.4571, G ¹ / ₂ B	0.6	0.6	0.6	0.6	31417W	
	PN 100	Stainless steel 1.4571, G ¹ / ₂ B	0.6	0.6	0.6	0.6	31331W	
	PN 250	Stainless steel 1.4571, G ¹ / ₂ B	0.6	0.6	0.6	0.6	31332W	
	Additional costs							
	Process connection G ¹ / ₂ B, PFA-coated							on request
	Process connection ¹ / ₂ -14 NPT							
	Process connection ¹ / ₂ -14 NPT, PFA-coated							on request
	Process connection G ¹ / ₂ female thread							no add. costs
	Process connection G ¹ / ₂ female thread, PFA-coated							on request
	MD 40 version for the paper and pulp industries							
	Instrument connection stainless steel 1.4571, welded connection							
	Process connection stainless steel 1.4571, DN 48, PN 40 (with seal and screws)							
	Retaining flange 1.4301, ranges 0/1.6 to 0/40 bar*							
							Part no.	Price €
	Direct mounting connection						31347W	
	Spare parts/accessories							
	6 screws M6 x 20						31418	
Spare seal, „Perbunan“ nitrile rubber 59 x 48 x 2						31419		
Welding flange 1.4301						31351		

* Valid for standard filling liquid, direct mounting (without capillary tube) and at a room and medium temperature of 20 °C.

Diaphragm seals, types MD 50/51/60

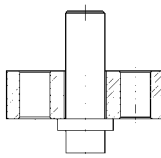
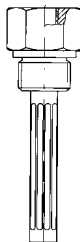
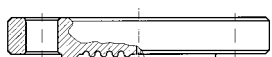
DG: M

	MD 50 for hygienic processes, grooved union nut DIN 11851							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	25	40	4	4	4	1	31300W	
	32	40	0.6	1.6	1.6	0.6	31301W	
	40	40	0.6	0.6	0.6	0.6	31302W	
	50	25	0.6	0.6	0.6	0.6	31303W	
	65	25	0.6	0.6	0.6	0.6	31304W	
	MD 50 for hygienic processes, threaded socket DIN 11851							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	25	40	4	4	4	1	31306W	
	32	40	0.6	1.6	1.6	0.6	31307W	
	40	40	0.6	0.6	0.6	0.6	31308W	
	50	25	0.6	0.6	0.6	0.6	31309W	
	65	25	0.6	0.6	0.6	0.6	31310W	on request
	MD 51 for hygienic processes, grooved union nut SMS 1147							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	1½"	40	0.6	0.6	0.6	0.6	31314W	
	2"	40	0.6	0.6	0.6	0.6	31315W	
	2½"	25	0.6	0.6	0.6	0.6	31316W	on request
	MD 51 for hygienic processes, threaded socket SMS 1147							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	1½"	40	0.6	0.6	0.6	0.6	31320W	
	MD 60 clamp connection ISO 2852							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	¾"	40	6	---	---	1.6	31913W	
	1"	40	4	4	---	1	31914W	
	1½"	40	0.6	0.6	1.6	0.6	31324W	
	2"	40	0.6	0.6	0.6	0.6	31325W	
	2½"	25	0.6	0.6	0.6	0.6	31326W	

* Valid for standard filling liquid, direct mounting (without capillary tube) and at a room and medium temperature of 20 °C.

Diaphragm seals, types MD 70/71/80

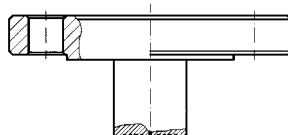
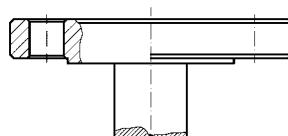
DG: M

	MD 70 version for homogenisation machines						Part no.	Price €
	Instrument connection stainless steel 1.4404 Process connection stainless steel 1.4404, DN 23,9, PN 600 Ranges 0/100 to 0/600 bar*							
	Price reduction without retaining flange						31352W	
							netto	
	MD 71 tongue type diaphragm seal						Part no.	Price €
	Instrument connection stainless steel 1.4571, G ¹ / ₂							
	Process connection stainless steel 1.4571, PN 1000 Ranges 0/60 to 0/1000 bar*							
	Process connection G ¹ / ₂ B						31353	
	Process connection G ³ / ₄ B						31354	
	MD 80 flange version, flange connection according to EN 1092-1 design B 1							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	25	40	4	4	4	0.6	31333W	
	40	40	4	4	4	0.6	31336W	
	50	40	0.6	0.6	0.6	0.6	31339W	
	80	40	4	4	4	0.6	31385W	
	100	40	0.6	0.6	0.6	0.6	31388W	
	MD 80 flange version, flange connection according to ASME B 16.5							
	Nominal width DN	Nominal pressure Class	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	1"	150	4	4	4	0.6	31393W	
		300	4	4	4	0.6	31394W	
	1½"	150	4	4	4	0.6	31396W	
		300	4	4	4	0.6	31397W	
	2"	150	4	4	4	0.6	31399W	
		300	4	4	4	0.6	31400W	
	3"	150	4	4	4	0.6	31402W	
		300	4	4	4	0.6	31403W	
	4"	150	4	4	4	0.6	31405W	
		300	4	4	4	0.6	31406W	

* Valid for standard filling liquid, direct mounting (without capillary tube) and at a room and medium temperature of 20 °C.

Diaphragm seals, types MD 81

DG: M

	MD 81 „tubus“ flange version, „tubus“ length 50 mm, flange connection according to EN 1092-1 design B 1							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	50	40	1	2.5	---	4	31917W	
	80	40	0.6	0.6	1	4	31921W	
	100	40	0.6	0.6	1	4	31924W	
	MD 81 „tubus“ flange version, „tubus“ length 50 mm, flange connection according to ASME B 16.5							
	Nominal width DN	Nominal pressure Class	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	1"	150	4	4	---	4	31938W	
	2"	150	1	2.5	---	4	31929W	
	3"	150	0.6	0.6	1	4	31931W	
	Additional costs €							
		Nominal width DN						
	„Tubus“ length	50/2"	80/3"				100	
	100 mm							
	150 mm							

* Valid for standard filling liquid, direct mounting (without capillary tube) and at a room and medium temperature of 20 °C.

Additional costs for diaphragm seals, types MD 80/81

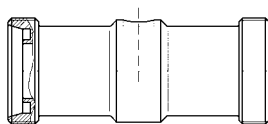
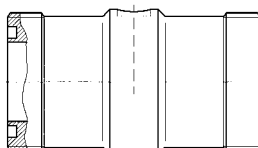
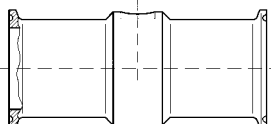
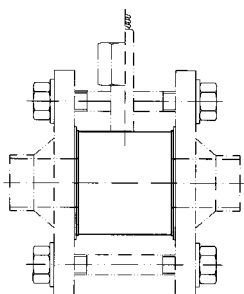
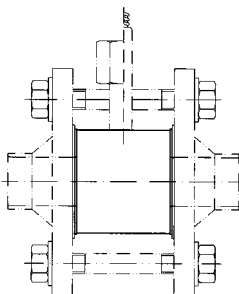
DG: M

Type of sealing surface		MD 80 Additional costs €	MD 81 Additional costs €
Groove, design D EN 1092-1 (for stainless steel)			on request
Tongue, design C EN 1092-1 (for stainless steel)			on request
Groove, design RJF ASME B 16.5			on request
Capillary connection			
Capillary connection, centre back		no additional cost	no additional cost
Capillary connection, bottom back		no additional cost	no additional cost
Special materials for wetted parts*	Nominal width		
Hastelloy C276	DN 25		on request
	DN 40		on request
	DN 50		on request
	DN 80		on request
	DN 100		on request
Tantalum	DN 25		on request
	DN 40		on request
	DN 50		on request
	DN 80		on request
	DN 100		on request
Monel 400, Nickel, Inconel, Platinum, Titanium		on request	on request
Coatings*			
PFA (up to 200 °C)	DN 25		on request
	DN 40		on request
	DN 50		on request
	DN 80		on request
	DN 100		on request
ECTFE (up to 150 °C)	DN 25		on request
	DN 40		on request
	DN 50		on request
	DN 80		on request
	DN 100		on request
PTFE, silver, gold		on request	on request

* Please enquire for special materials for groove or tongue version.

In-line chemical seals, types RD 50/51/60/80

DG: M

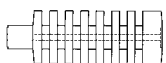
	RD 50 for hygienic processes, male thread DIN 11851							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	15	40	1.6	---	---	4	31952W	on request
	25	40	1.6	2.5	---	0.6	31365W	
	32	40	1	2.5	---	0.6	31953W	
	40	40	1	2.5	4	0.6	31366W	
	50	40	1	2.5	4	0.6	31367W	
	80	40	1	2.5	4	0.6	31369W	
	RD 51 for hygienic processes, threaded socket SMS 1147							
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	1"	40	1.6	2.5	---	1.6	31371W	
	1½"	40	1.6	2.5	4	1.6	31372W	
	2"	40	1	1.6	2.5	1.6	31373W	
	2½"	40	1	1.6	2.5	1.6	31374W	
	3"	40	1	1.6	1.6	1.6	31375W	
		RD 60 clamp connection ISO 2852						
Nominal width DN		Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
1"		40	1.6	2.5	---	1.6	31377W	
1½"		40	1.6	2.5	4	1.6	31378W	
2"		40	1.6	2.5	2.5	1	31379W	
2½"		40	1.6	2.5	2.5	1	31380W	
3"		40	1.6	2.5	2.5	1	31381W	
		RD 80 intermediate flange version for flanges according to EN 1092-1 design B 2						
	Nominal width DN	Nominal pressure PN	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
	25	4-400	1.6	2.5	---	1.6	31355	
	40	4-400	1.6	2.5	4	1.6	31356	
	50	4-400	1.6	2.5	2.5	1	31357	
	65	4-400	1.6	2.5	2.5	1	31956	
	80	4-400	1.6	2.5	2.5	1	31358	
		RD 80 intermediate flange version for flanges according to ASME B 16.5						
Nominal width DN		Nominal pressure Class	Minimum meas. range* (in bar) at nominal size				Part no.	Price €
			63	100	160	DMU		
1"		150-6,000	1.6	2.5	---	1.6	31360	
1½"		150-6,000	1.6	2.5	4	1.6	31361	
2"		150-6,000	1.6	2.5	2.5	1	31362	
3"		150-6,000	1.6	2.5	2.5	1	31363	
4"		150-6,000	1.6	2.5	2.5	1	31364	

* Valid for standard filling liquid, direct mounting (without capillary tube) and at a room and medium temperature of 20 °C.

Diaphragm seals - fitting costs and accessories

DG : M

The fitting costs include the mounting of the pressure gauge or pressure transducer to the diaphragm seal, filling of the system with transmission fluid, securing the screw connections and calibration of the system at a room temperature of +20 °C. The final price is made up of the price for the pressure gauge, the price for the diaphragm seal and the fitting cost as well as the price for options and/or accessories, where applicable.

Fitting costs € ¹⁾		Length of capillary tube	Fitting to AFRISO Bourdon tube pressure gauges ²⁾		Fitting to AFRISO pressure transducers ²⁾			
			Part no.	Price €	Part no.	Price €		
Direct mounting (at >100 °C it is advisable to use a cooling element or a capillary tube)		---	32007		32016			
Fitting with capillary tube		1 metre	32008		32017			
Capillary tube stainless steel 1.4571, screwed or welded to diaphragm seal, with kink protection and connection piece for instrument bracket		2 metres	32009		32018			
		3 metres	32010		32019			
		4 metres	32011		32020			
		5 metres	32012		32021			
		6 metres	32013		32022			
		8 metres	32014		32023			
		10 metres	32015		32052			
		other		on request	on request			
Additional costs			Price €					
Spiral protection hose per metre								
Calibration of filled system at operating temperatures other than +20 °C (between +20 and +100 °C), with dial marking $t_A = x$ °C dial								
Calibration of filled system at operating temperatures other than +20 °C (between 100 and +180 °C), with dial marking $t_A = x$ °C dial								
Other filling liquids		Operating temperature range ³⁾						
FM 01	Silicone oil	-20/+200 °C	Standard/no additional cost					
FM 02	Silicone oil	-90/+100 °C						
FM 03	Glycerine	0/+230 °C	Standard/no additional cost					
FM 04	Glycerine/water	-10/+120 °C	no additional cost					
FM 05	Vegetable oil	-10/+250 °C	Standard/no additional cost					
FM 06	High temperature oil	-10/+300 °C						
FM 07	High temperature oil	-10/+400 °C						
FM 08	Halocarbon ⁴⁾ (for oxygen or chlorine)	-40/+175 °C						
FM 09	Paraffin oil (FDA-compliant)	-10/+220 °C						
Accessories			Version	Part no.	Price €	Version	Part no.	Price €
Adapter for instrument connection with thread and filling port, for welding to diaphragm seal			Instrument connection G1/4 female	32003		Instrument connection G1/2 female	32004	
Cooling element, can be welded at both ends (only factory-fitted)			Up to T_{max} medium 200 °C (Ø 27)	32005		Up to T_{max} medium 300 °C (Ø 40)	32006	
Cooling element, screw connection at both ends G1/2 female x male			Up to T_{max} medium 200 °C (Ø 27)	31420		Up to T_{max} medium 300 °C (Ø 40)	31421	

¹⁾ For differential pressure measuring devices = twice the additional cost

²⁾ Please enquire for other makes or measuring instruments

³⁾ Only at positive overpressure

⁴⁾ Up to a maximum of 160 bar

Pressure switches DS 600



Type DS 600/200

Switching point

Set to 1 bar (can be factory-adjusted between 0.5 and 6 bar)

Overpressure safety

7 bar

Switching differential

0.3 bar

Pressure connection

Brass, R¹/₄ DIN 2999, fixed thread

Housing

Plastic/sheet steel
W x H x D: 44 x 29 x 32 mm

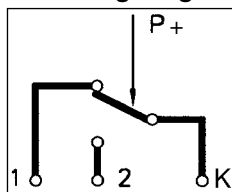
Protection

IP 00 (EN 60529)

Contact rating

K1 16 (4) A AC 250 V
K1-2 6 (1) A AC 400 V

Switching diagram



Type DS 600/220

Switching point

Set to 1 bar (can be factory-adjusted between 1 and 6 bar)

Overpressure safety

7 bar

Switching differential

0.3 bar

Pressure connection/capillary

Brass, G¹/₄B, pressure screw (rotatable), capillary length 1,000 mm

Housing

Plastic/sheet steel
W x H x D: 44 x 37 x 34 mm

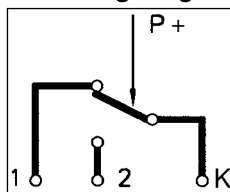
Protection

IP 00 (EN 60529)

Contact rating

K1 16 (4) A AC 250 V
K1-2 6 (1) A AC 400 V

Switching diagram



Type DS 600/250

Switching point

Factory pre-set to required value between 0.5 and 6 bar

Overpressure safety

2 bar greater than switching point

Switching differential

0.3 bar

Pressure connection

Brass, R¹/₄ DIN 2999, fixed thread

Housing

Plastic/stainless steel
34 x 26 mm (Ø x H)

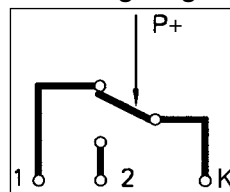
Protection

IP 00 (EN 60529)

Contact rating

K1 16 (4) A AC 250 V
K1-2 6 (1) A AC 400 V

Switching diagram

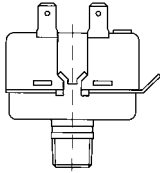
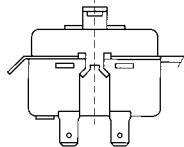
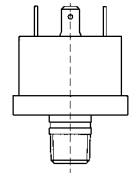


Options

- Fixed cable connection with 1 metre cable
- Other switching points

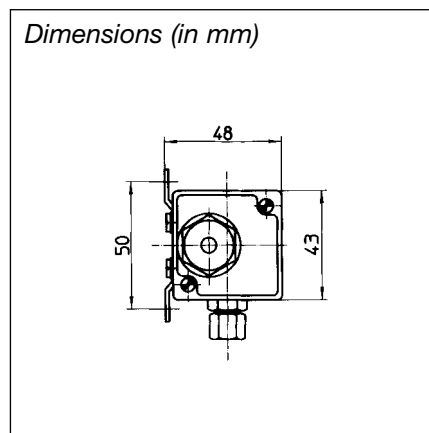
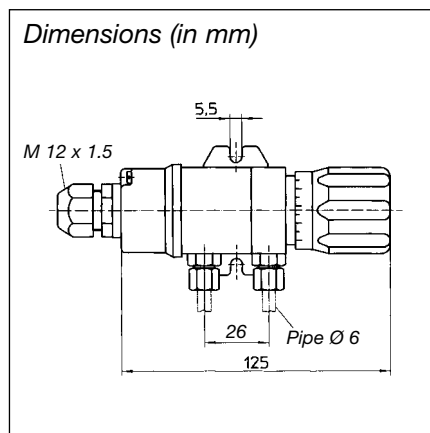
Pressure switches DS 600

DG: H

Type	DS 600/200	DS 600/220	DS 600/250
Version			
Contact type	Changeover contact	Changeover contact	Changeover contact
Switching point	Factory pre-set to 1 bar*	Factory pre-set to 1 bar*	Factory pre-set as required to a value between 0.5 and 6 bar
Type of connection	direct mounting	with capillary tube	direct mounting
Minimum order quantity	1,000 pieces	1,000 pieces	200 pieces
Packing unit	100 pieces	100 pieces	200 pieces
Delivery only in packing units			
Connection	Price € Part no.	Price € Part no.	Price € Part no.
R ¹ / ₄ DIN 2999 fixed thread	88142	---	88140
G ¹ / ₄ B pressure screw capillary 1,000 mm	---	88146	---
G ¹ / ₄ B pressure screw capillary 1,500 mm	---	88147	---
G ¹ / ₄ B pressure screw capillary 2,000 mm	---	88148	---

* Other switching points can be factory pre-set – please specify with order.

Differential pressure switches DS 01



Application

Suitable for all practically neutral media such as process water, heating water, neutral gases, oils. Suitable for two-point control by means of a continuously adjustable switching point (between 10 and 100 % of pressure range).

Function

A robust diaphragm type movement serves as the basis for this unit. It is suitable for pressure, vacuum and differential pressure measurements. The unit uses the same principle of operation for all three measuring applications. The pressure or the differential pressure applies a force to one side of the diaphragm. This force displaces the diaphragm system and moves the measurement range spring. A switching plunger fixed to the diaphragm actuates an electrical switching element. The switching point is adjusted via a knurled knob according to the scale.

Pressure ranges

0/0.6 to 0/4 bar

Maximum static pressure

16 bar, device is overpressure-proof up to 16 bar and vacuum-proof

Operating temperature range

Medium: $T_{max} = +80\text{ }^{\circ}\text{C}$
Ambient: $T_{max} = +80\text{ }^{\circ}\text{C}$

Connection

2 x G $\frac{1}{8}$ female thread

Pressure chamber

Brass

Diaphragm

NBR

Mounting

Bracket for wall mounting

Electrical connection

Cable gland M 12 x 1.5

Switching point

10-100 % of pressure range, continuously adjustable

Contact

Microswitch, normally closed or normally open

Hysteresis

approx. 2 %

Max. rating

U ... AC/DC 250 V, I ... 3 A
P ... 500 VA/250 W

DG: H

Pressure range	Part no.	Price €
0/0.6 bar	88103	
0/1 bar	88104	
0/1.6 bar	88105	
0/2.5 bar	88107	
0/4 bar	88106	

Additional costs - options

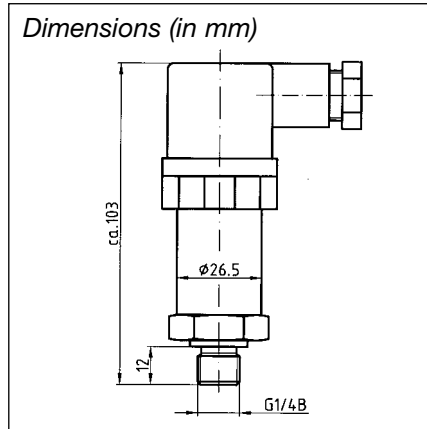
DG: H

Option	Part no.	Price €
Diaphragm FKM	88125	
Fixed cable 2.5 m*	88126	
Compression fitting for 6 mm pipe, steel	88120	
Compression fitting for 6 mm pipe, brass	88108	
Compression fitting for 8 mm pipe, brass	88114	

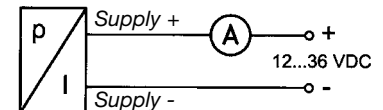
* Please specify required switching function (normally closed/normally open)

Pressure transducer DMU 01K

Compact version



Wiring diagram



Application

Special OEM unit. For electronic pressure measurement in industrial or HVAC applications (such as hydraulic, pneumatic, automation, heating or air conditioning).

Description

The DMU 01K pressure transducers use proven ceramic measuring cell technology and feature calibrated, amplified sensor signals which are available as standardised current outputs.

DMU 01K features:

- Compact design
- Superior price/performance ratio due to automated mass production
- High temperature resistance
- No mechanical ageing

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 1\%$ FSO

Measuring ranges

Relative pressure: 0/1.6 to 0/100 bar

Overpressure safety

At least 2 x FS
(burst pressure at least 3 x FS)

Operating temperature range

Medium: $-25\text{ }^{\circ}\text{C}/+125\text{ }^{\circ}\text{C}$
 Ambient: $-25\text{ }^{\circ}\text{C}/+85\text{ }^{\circ}\text{C}$
 Storage: $-40\text{ }^{\circ}\text{C}/+125\text{ }^{\circ}\text{C}$

Temperature error band

In compensated range
 $0-70\text{ }^{\circ}\text{C} \leq 0.5\%$ FSO/10 K

Dynamic characteristics

Response time $< 10\text{ ms}$

Process connection

G1/4B, DIN 3852

Materials

Housing: stainless steel 1.4305
 Pressure-connection: stainless steel 1.4305
 Diaphragm: ceramic Al_2O_3 96 %
 Seal: FKM (Viton)

Supply voltage

DC 12-36 V

Output signal

4-20 mA, 2-wire

Load

$4-20\text{ mA} \leq \frac{U_B\text{ (V)} - 12\text{ V}}{0.02\text{ A}}$ [Ohm]

Current input

4-20 mA $< 30\text{ mA}$

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

Plug and junction box
 DIN 43650-A (IP 65)

CE conformity (EMC)

EN 61326

Options

- Fixed cable connection
- Other output signals

Pressure transducers DMU 01

Standard version



Flush mounted diaphragm



DMU 01 with DA 06 plug-in local display



Application

For electronic pressure measurement in industrial applications (such as hydraulic and pneumatic applications as well as machine and plant construction).

Description

The DMU 01 pressure transducers use proven ceramic measurement cell technology and feature calibrated, amplified sensor signals which are available as standardised voltage or current outputs.

DMU 01 features:

- High temperature resistance
- No mechanical ageing
- No transmission liquid

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 0,5 \% \text{ FSO}$

Measuring ranges

Relative pressure: -1/0 to 0/400 bar
Absolute pressure: 0/1 to 0/400 bar

Overpressure safety

$\leq 250 \text{ bar min. } 2 \times \text{FS}$
 $> 250 \text{ bar min. } 1.5 \times \text{FS}$
(burst pressure min. $3 \times \text{FS}$)

Operating temperature range

Medium: $-25^\circ\text{C}/+125^\circ\text{C}$
Ambient: $-25^\circ\text{C}/+85^\circ\text{C}$
Storage: $-40^\circ\text{C}/+100^\circ\text{C}$

Temperature error band

In compensated range
 $\leq \pm 0.3 \% \text{ FSO}/10 \text{ K}$

Dynamic characteristics

Response time $< 10 \text{ ms}$

Process connection

G $1/2$ B (EN 837-1/7.3) or
G $1/2$ B DIN 3852 with flush mounted diaphragm (up to 0/25 bar max.)

Materials

Housing: stainless steel 1.4305
Pressure-connection: stainless steel 1.4305
Diaphragm: ceramic Al_2O_3 96 %
Seal: FKM (Viton), NBR for 100 bar and above

Output signal/supply voltage

4-20 mA DC 12-36 V
2-wire
0-10 V DC 14-36 V
3-wire

Load

4-20 mA $\leq \frac{U_B (V) - 12 V}{0.02 A} [\text{Ohm}]$
0-10 V $> 10 \text{ kOhm}$

Current input

4-20 mA $< 25 \text{ mA}$
0-10 V $< 7 \text{ mA}$

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

Plug and junction box
DIN 43650-A (IP 65)

CE conformity (EMC)

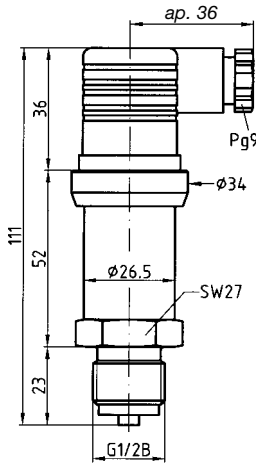
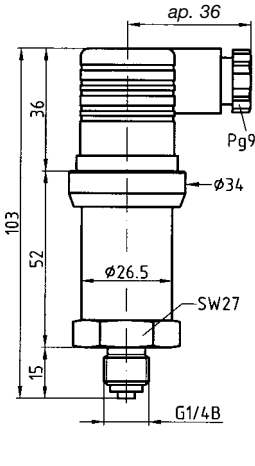
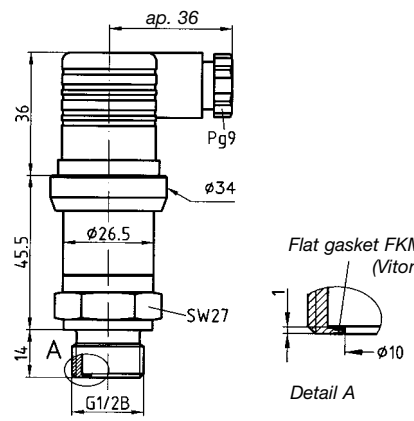
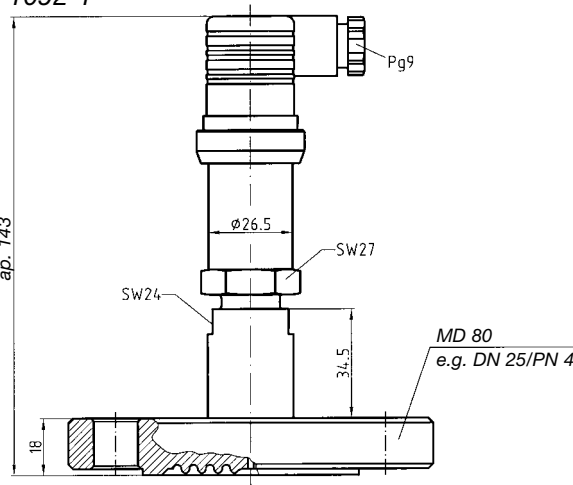
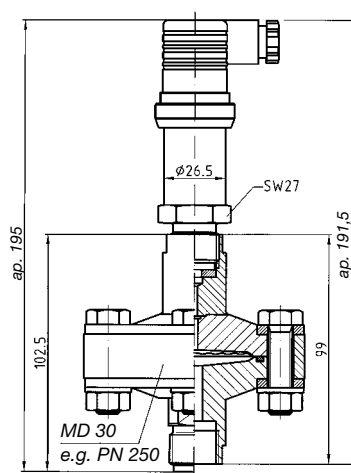
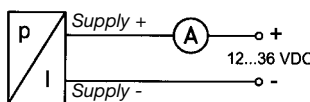
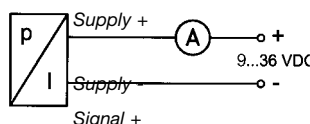
EN 61326

Options

- Other connection threads
- Fixed cable connection
- Other plug-in connectors
- Fitting of diaphragm seals (measuring range $\geq 0/10 \text{ bar}$)

Pressure transducers DMU 01

Dimensions (in mm) and electrical connections

Connection G1½B EN 837 	Connection G1¼B EN 837 	Connection G1½B DIN 3852 with flush mounted diaphragm 																														
With diaphragm seal MD 80 - flange connection EN 1092-1 	With diaphragm seal MD 30 - connection G1½B 																															
Wiring diagrams 2-wire 4-20 mA  3-wire 0-10 V 																																
Pin assignment table <table><tr><th></th><th>Plug DIN 43650</th><th>Cable colours (DIN 47100)</th></tr><tr><td>2-wire system:</td><td></td><td></td></tr><tr><td>Supply +</td><td>1</td><td>white</td></tr><tr><td>(4-20 mA) Supply -</td><td>2</td><td>brown</td></tr><tr><td>Earth</td><td>Earth pin</td><td>Screen</td></tr><tr><td>3-wire system:</td><td></td><td></td></tr><tr><td>Supply +</td><td>1</td><td>white</td></tr><tr><td>(0-10 V) Supply -</td><td>2</td><td>brown</td></tr><tr><td>Signal +</td><td>3</td><td>green</td></tr><tr><td>Earth</td><td>Earth pin</td><td>Screen</td></tr></table>				Plug DIN 43650	Cable colours (DIN 47100)	2-wire system:			Supply +	1	white	(4-20 mA) Supply -	2	brown	Earth	Earth pin	Screen	3-wire system:			Supply +	1	white	(0-10 V) Supply -	2	brown	Signal +	3	green	Earth	Earth pin	Screen
	Plug DIN 43650	Cable colours (DIN 47100)																														
2-wire system:																																
Supply +	1	white																														
(4-20 mA) Supply -	2	brown																														
Earth	Earth pin	Screen																														
3-wire system:																																
Supply +	1	white																														
(0-10 V) Supply -	2	brown																														
Signal +	3	green																														
Earth	Earth pin	Screen																														

The units are shipped with a detailed wiring diagram.

Pressure transducers DMU 03

Industrial version



Application

For electronic pressure measurement in machine and plant construction applications as well as in chemical and process technology applications. With flush mounted diaphragm, the units are suitable for use with sticky, highly viscous or crystallising media.

Description

The DMU 03 pressure transducers use piezo-resistive stainless steel measuring cells and feature calibrated, amplified sensor signals which are available as standardised voltage or current outputs.

DMU 03 is available in the following versions:

- Threaded connection
- Flush mounted diaphragm
- Ex version (DMU 03Ex)
- Weatherproof housing version
- Weatherproof housing version with display

Accuracy of measurement

Deviation characteristic according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 0.35\%$ FSO
(measuring ranges 0/40 mbar to 0/400 mbar $< \pm 0.5\%$ FSO)

Long-term stability

$\leq \pm 0.1\%$ FSO/year

Measuring ranges

Relative: 0/40 mbar to 0/600 bar
Absolute: 0/100 mbar to 0/600 bar

Overpressure safety

≤ 250 bar min. $2 \times$ FS
 > 250 bar min. $1.5 \times$ FS
(burst pressure min. $3 \times$ FS)

Operating temperature range

Medium: $-25\text{ }^{\circ}\text{C}/+125\text{ }^{\circ}\text{C}$
Ambient: $-25\text{ }^{\circ}\text{C}/+85\text{ }^{\circ}\text{C}$
Storage: $-40\text{ }^{\circ}\text{C}/+100\text{ }^{\circ}\text{C}$

Temperature error band

In compensated range
 $0-70\text{ }^{\circ}\text{C} \leq 1\%$ FSO
(≤ 0.25 bar $\leq 2\%$ FSO)

Dynamic characteristics

Response time < 10 ms

Process connection

G $1/2$ B (EN 837-1/7.3) or
G $1/2$ B DIN 3852 with flush mounted diaphragm (0/100 mbar to 0/40 bar)

Materials

Housing: stainless steel 1.4301
Pressure-connection: stainless steel 1.4571
Diaphragm: stainless steel 1.4435
Seal: FKM (Viton), NBR for 60 bar and above

Pressure transmission liquid

Silicone oil

Weatherproof housing version (optional)

with display

Output signal/supply voltage

4-20 mA DC 12-36 V
2-wire
Ex version DC 14-28 V
0-20 mA DC 14-36 V
3-wire
0-10 V DC 14-36 V
3-wire

Load

4-20 mA $\leq \frac{U_B (V) - 12 V}{0.02 A}$ [Ohm]
0-20 mA ≤ 500 Ohm
0-10 V > 10 kOhm

Current input

4-20 mA < 25 mA
0-20 mA < 25 mA
0-10 V < 7 mA

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

Plug and junction box DIN 43650-A (IP 65)

CE conformity (EMC)

EN 61326

Options

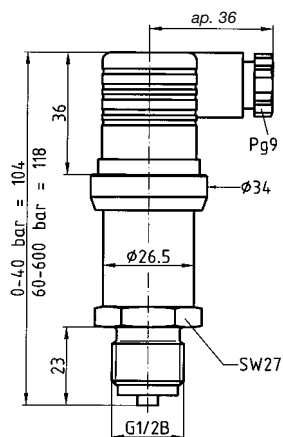
- Ex version (II 1 G EEx ia IIC T4)
- Other process connections
- Other electrical connections
- Weatherproof housing (stainless steel 1.4305)
- Weatherproof housing with display
- Other seal materials
- CANopen interface
- Higher accuracy
- Greater overpressure safety
- Diaphragm seal mounting

Refer to pages 420/421 for part no.

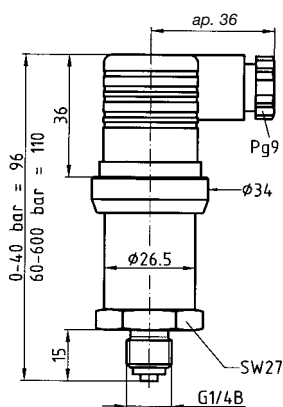
Pressure transducers DMU 03

Dimensions (in mm) and electrical connections

Connection G¹/₂B
EN 837

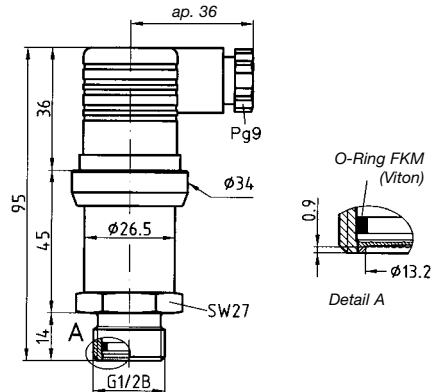


Connection G¹/₄B
EN 837



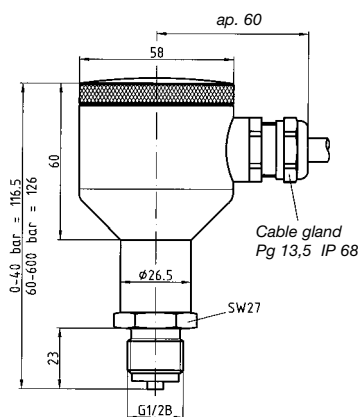
The Ex version is 20 mm longer.

Connection G¹/₂B DIN 3852 with flush mounted diaphragm



The Ex version is 20 mm longer.

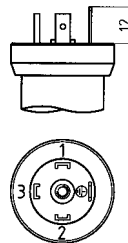
Weatherproof housing



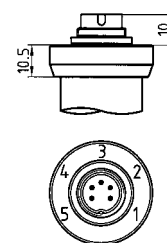
The Ex version is 26.5 mm longer.

Electrical connections

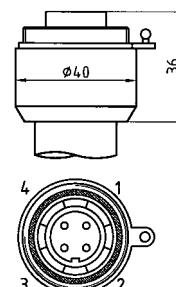
DIN 43650



„Binder“ plug 723



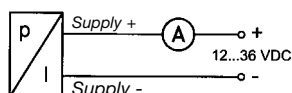
„Buccaneer“ plug



Wiring diagram

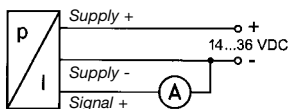
2-wire

4-20 mA

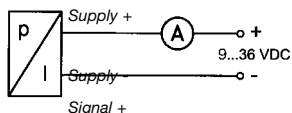


3-wire

0-20 mA



0-10 V



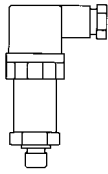
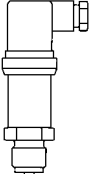
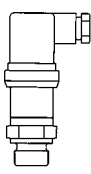
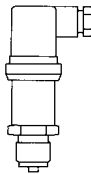
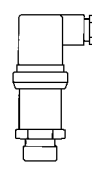
Pin assignment table

			Plug DIN 43650	Cable colours (DIN 47100)
2-wire system:	Supply	+	1	white
	(4-20 mA) Supply	-	2	brown
	Earth		Earth pin	Screen
3-wire system:	Supply	+	1	white
	(0-10 V, Supply	-	2	brown
	0-20 mA) Signal	+	3	green
	Earth		Earth pin	Screen

The units are supplied with a detailed wiring diagram.

Pressure transducers

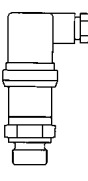
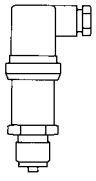
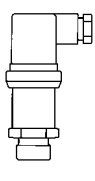
DG: H

Type	DMU 01 K*	DMU 01	DMU 01 VM	DMU 03	DMU 03 VM
Version					
Measuring principle	Piezo-resistive ceramic measuring cell			Piezo-resistive stainless steel meas. cell	
Accuracy (IEC 60770)	1 % FSO	0.5 % FSO	0.5 % FSO	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)
Wetted parts	Ceramic/stainless steel 1.4305			Stainless steel 1.4571/1.4435	
Connection	G ¹ / ₄ B DIN 3852	G ¹ / ₂ B EN 837	G ¹ / ₂ B DIN 3852 with flush mounted diaphragm	G ¹ / ₂ B EN 837	G ¹ / ₂ B with flush mounted diaphragm
Supply voltage	DC 12-36 V	DC 12-36 V	DC 12-36 V	DC 12-36 V	DC 12-36 V
Output	4-20 mA	4-20 mA	4-20 mA	4-20 mA	4-20 mA
System	2-wire	2-wire	2-wire	2-wire	2-wire
Electrical Connection	Plug DIN 43650-A	Plug DIN 43650-A	Plug DIN 43650-A	Plug DIN 43650-A	Plug DIN 43650-A
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.
Price €					
-1/0 bar	---	31114	31619	31634	---
-1/+1.5 bar	31608	31616	31620	31635	---
-1/+3 bar	31609	31617	31621	31636	---
-1/+5 bar	31610	31618	31622	31637	---
Price €					
0/40 mbar	---	---	---	32024	---
0/60 mbar	---	---	---	32025	---
0/100 mbar	---	---	---	31638	31643
0/160 mbar	---	---	---	31639	31644
0/250 mbar	---	---	---	31145	31165
0/400 mbar	---	---	---	31146	31166
0/600 mbar	---	---	---	31147	31167
Price €					
0/1 bar	---	31115	31623	31148	31168
0/1.6 bar	31511	31116	31624	31149	31169
0/2.5 bar	31512	31117	31625	31150	31170
0/4 bar	31513	31118	31626	31151	31171
0/6 bar	31514	31119	31627	31152	31172
0/10 bar	31515	31120	31628	31153	31173
0/16 bar	31516	31121	31629	31154	31174
0/25 bar	31517	31122	31630	31155	31175
0/40 bar	31518	31123	---	31156	32026
0/60 bar	31611	31124	---	31157	---
0/100 bar	31612	31125	---	31158	---
Price €					
0/160 bar	---	31126	---	31159	---
0/250 bar	---	31127	---	31160	---
0/400 bar	---	31128	---	31161	---
0/600 bar	---	---	---	31162	---

* Delivery only in packing units of 10 pieces per measuring range.

Additional costs for pressure transducers

DG: H

Type	DMU 01	DMU 01 VM	DMU 03	DMU 03 VM	
Version					
	Price €	Price €	Price €	Price €	
Ex protection II 1 G EEx ia IIC T4	---	---			
Connection G ¹ / ₄ DIN 3852	---	---		---	
Connection G ¹ / ₂ DIN 3852	---	standard	no add. cost	standard	
Connection G ¹ / ₄ B EN 837		---		---	
Connection ¹ / ₄ NPT		---		---	
Connection ¹ / ₂ NPT		---		---	
Other connections	on request	on request	on request	on request	
Suitable for oxygen			---	---	
Weatherpr. housing (stainl. steel 1.4305)	---	---			
Weatherproof housing with display (as DA 06)	---	---			
„Binder“ plug 723	---	---			
Fixed cable connection 2 metres					
Cable extension per metre					
Output 0-20 mA, 3 wires	---	---			
Output 0-10 V, 3 wires					
Other output signals	on request	on request	on request	on request	
Absolute pressure (measuring ranges according to data sheet)					
Accuracy of measurement 0.25 % FSO	---	---			
Calibration certificate (for accuracy of measurement 0.25 % FSO)	---	---			
Fitting of diaphragm seal	for measuring range 0/10 bar		All measuring ranges, minimum range depends on design of diaphragm seal		

Refer to chapter 14 for digital display units and signal processing.



Pressure transducers DMU 04 for hygienic processes



Application

For applications requiring hygienic process connections, materials or processing, especially in food technology, pharmaceutical and biotech applications.

Description

The DMU 04 pressure transducers use piezo-resistive measuring cells and feature calibrated, amplified sensor signals which are available as standardised voltage or current outputs.

DMU 04 is available in the following versions:

- Flush diaphragm
- Various process connections
- Ex version (DMU 04Ex)
- High temperature version up to 300 °C (DMU 04HT)
- Weatherproof housing version
- Weatherproof housing version with display

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 0.35 \% \text{ FSO}$
(ranges $\leq 0/400 \text{ mbar}$ $< \pm 0.5 \% \text{ FSO}$)

Measuring ranges

Relative: 0/100 mbar to 0/400 bar
Absolute: 0/600 mbar to 0/400 bar

Overpressure safety

$\leq 250 \text{ bar min. } 2 \times \text{FS}$
 $> 250 \text{ bar min. } 1.5 \times \text{FS}$
(burst pressure min. $3 \times \text{FS}$)

Operating temperature range

Medium: $-25 \text{ }^{\circ}\text{C}/+125 \text{ }^{\circ}\text{C}$
Ambient: $-25 \text{ }^{\circ}\text{C}/+85 \text{ }^{\circ}\text{C}$
Storage: $-40 \text{ }^{\circ}\text{C}/+100 \text{ }^{\circ}\text{C}$

Temperature error band

In compensated range
 $0-70 \text{ }^{\circ}\text{C} \leq 1 \% \text{ FSO}$
($\leq 0.25 \text{ bar} \leq 2 \% \text{ FSO}$)

Dynamic characteristics

Response time $< 10 \text{ ms}$

Process connections

G $1/2$ B DIN 3852 with flush diaphragm
($\geq 0/2.5 \text{ bar}$), G1B DIN 3852,
clamp 1 $1/16$ "/2" ISO 2852,
conical dairy fitting DIN 11851
DN 25/40/50 (without union nut)

Materials

Housing: stainless steel 1.4301
Pressure-connection: stainless steel 1.4435
Diaphragm: stainless steel 1.4435

Pressure transmission liquid

Food quality oil

Output signal/supply voltage

4-20 mA DC 12-36 V
2-wire
Ex version DC 14-28 V
0-20 mA DC 14-36 V
3-wire
0-10 V DC 14-36 V
3-wire

Load

$4-20 \text{ mA} \leq \frac{U_B (V) - 12 V}{0.02 A} [\text{Ohm}]$
 $0-20 \text{ mA} \leq 500 \text{ Ohm}$
 $0-10 V > 10 \text{ kOhm}$

Current input

4-20 mA $< 25 \text{ mA}$
0-20 mA $< 25 \text{ mA}$
0-10 V $< 7 \text{ mA}$

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

Plug and junction box
DIN 43650-A (IP 65)

CE conformity (EMC)

EN 61326

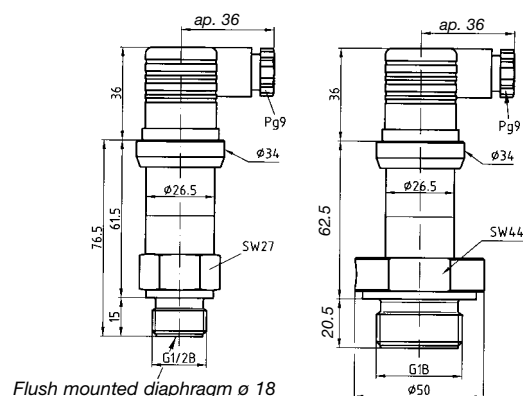
Options

- Ex version (II 1 G EEx ia IIC T4)
- Other process connections
- Other electrical connections
- Weatherproof housing
- Weatherproof housing with display
- High temperature version
- Higher accuracy
- Union nut DN 25/40/50

Pressure transducers DMU 04

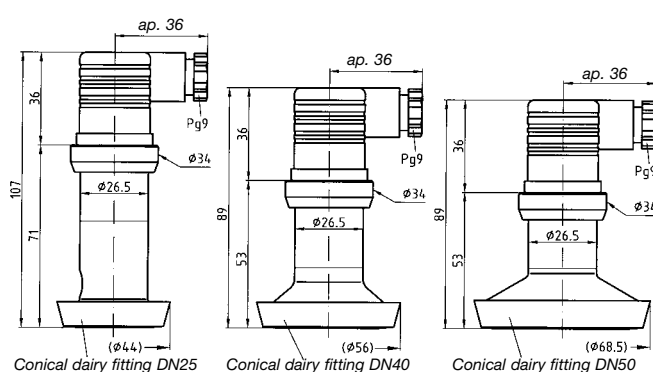
Dimensions (in mm) and electrical connections

Threaded connections with flush diaphragm

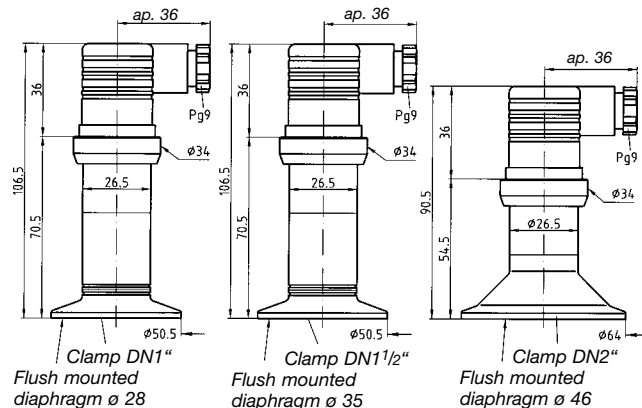


The Ex version is 26.5 mm longer.

Conical dairy fitting DIN 11851

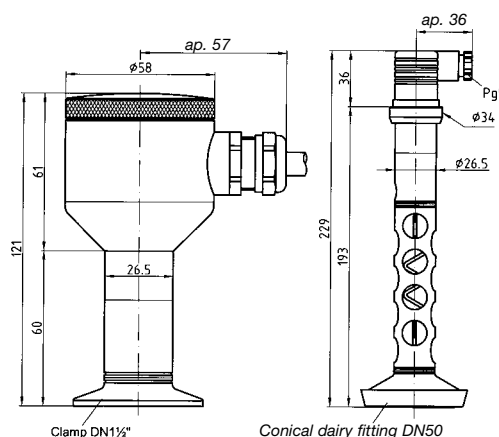


Clamp connections ISO 2852



Weatherproof housing

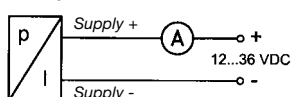
High temperature version - DMU 04 HT



Wiring diagram

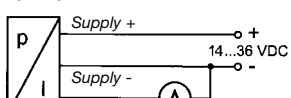
2-wire

4-20 mA

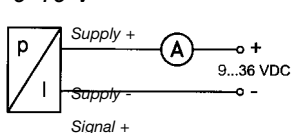


3-wire

0-20 mA



0-10 V



Pin assignment table

			Plug DIN 43650	Cable colours (DIN 47100)
2-wire system:	Supply	+	1	white
	(4-20 mA) Supply	-	2	brown
	Earth		Earth pin	Screen
3-wire system:	Supply	+	1	white
	(0-10 V, Supply	-	2	brown
	0-20 mA) Signal	+	3	green
	Earth		Earth pin	Screen

The units are supplied with a detailed wiring diagram.

Pressure transducers DMU 05 P

Precision version



Flush mounted diaphragm



Application

For electronic pressure measurement in applications requiring high accuracy of measurement and long-term stability. Application areas include: process technology, electroplating, water treatment, laboratory applications as well as measurements of gas consumption and heat energy.

Description

The intelligent DMU 05 pressure transducers are equipped with digital amplifier electronics (micro-processor and 16 bit A/D converter). DMU 05 actively compensates for sensor-specific deviations (non-linearity and temperature error), allowing for superior measuring characteristics. DMU 05 can also be supplied with an optional digital RS 232 interface for setting offset, range and damping.

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $\leq \pm 0.1\%$ FSO

Long-term stability

$\leq \pm 0.1\%$ FSO/year

Measuring ranges

Relative: 0/160 mbar to 0/600 bar
Absolute: 0/160 mbar to 0/600 bar

Overpressure safety

≤ 250 bar min. $2 \times$ FS
 > 250 bar min. $1.5 \times$ FS
(burst pressure min. $3 \times$ FS)

Operating temperature range

Medium: $-25\text{ }^{\circ}\text{C}/+125\text{ }^{\circ}\text{C}$
Ambient: $-25\text{ }^{\circ}\text{C}/+85\text{ }^{\circ}\text{C}$
Storage: $-40\text{ }^{\circ}\text{C}/+100\text{ }^{\circ}\text{C}$

Temperature error band

In compensated range
 $-20/+80\text{ }^{\circ}\text{C} \leq 0.2\%$ FSO

Dynamic characteristics

Response time < 40 ms

Process connection

G $1/2$ B (EN 837-1/7.3) or
G $1/2$ B DIN 3852 with flush mounted diaphragm (up to 0/25 bar)

Materials

Housing: stainless steel 1.4301
Pressure-connection: stainless steel 1.4571
Diaphragm: stainless steel 1.4435
Seal: FKM (Viton), NBR for 40 bar and above

Pressure transmission liquid

Silicone oil

Output signal/supply voltage

4-20 mA DC 12-36 V
2-wire
Ex version DC 14-28 V

Load

4-20 mA $\leq \frac{U_B (V) - 12 V}{0.02 A}$ [Ohm]

Current input

4-20 mA < 25 mA

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

Plug and junction box
DIN 43650-A (IP 65)

CE conformity (EMC)

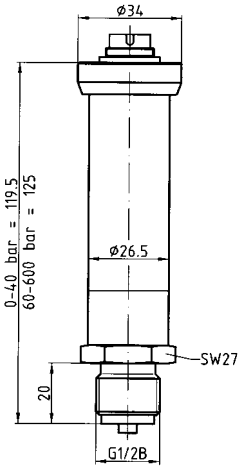
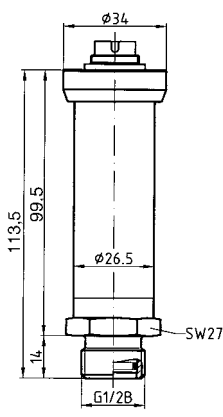
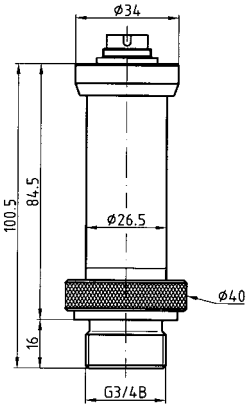
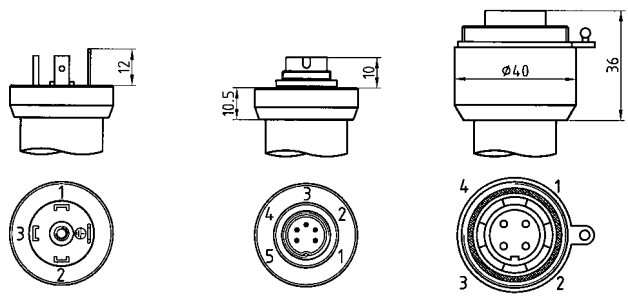
EN 61326

Options

- RS 232 (interface and software required)
- Ex version (II 1 G EEx ia IIC T4)
- Other process connections
- Other electrical connections
- Other seal materials

Pressure transducers DMU 05

Dimensions (in mm) and electrical connections

Connection G1/2B EN 837 	Connection G1/2B DIN 3852 with flush mounted diaphragm 
Screw-in version for level measurement 	Electrical connections DIN 43650 „Binder“ plug 723 „Buccaneer“ plug 

Pin assignment table

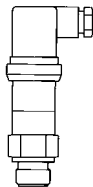
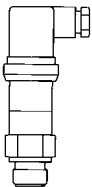
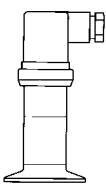
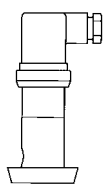
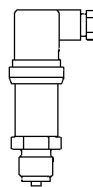
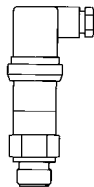
		Electrical connections		
		DIN 43650	„Binder“ plug 723 (5 poles)	„Binder“ plug 723 (7 poles)
2-wire system:	Supply + Supply - Earth	1 2 Earth contact	3 4 5	3 1 2
RS 232 ¹⁾	RxD TxD CTS GND	-	-	4 5 6 7

¹⁾ Software, interface and cable must be ordered separately.

The units are supplied with a detailed wiring diagram.

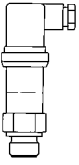
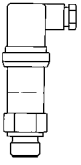
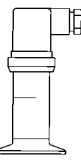
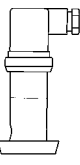
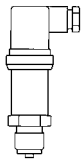
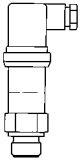
Pressure transducers

DG: H

Type	DMU 04	DMU 04	DMU 04 CP	DMU 04 MR	DMU 05 P	DMU 05 P VM
Version						
Meas. principle	Piezo-resistive					
Accuracy (IEC 60770)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.1 % FSO	0.1 % FSO
Wetted parts	Stainless steel 1.4435				Stainless steel 1.4435	
Connection	G1½B DIN 3852 with flush mounted diaphragm	G1B DIN 3852 with flush mounted diaphragm	Clamp 1" ISO 2852	Conical dairy fitting DIN 11851 DN 25 (without union nut)	G1½B EN 837	G1½B DIN 3852 with flush mounted diaphragm
Supply voltage	DC 12-36 V	DC 12-36 V	DC 12-36 V	DC 12-36 V	DC 12-36 V	DC 12-36 V
Output	4-20 mA	4-20 mA	4-20 mA	4-20 mA	4-20 mA	4-20 mA
System	2-wire	2-wire	2-wire	2-wire	2-wire	2-wire
Electrical connection	Plug DIN 43650-A	Plug DIN 43650-A	Plug DIN 43650-A	Plug DIN 43650-A	Plug DIN 43650-A	Plug DIN 43650-A
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
-1/0 bar	---	31663	31686	31719	31742	---
-1/+1.5 bar	31647	31664	31687	31720	31743	---
-1/+3 bar	31648	31665	31688	31721	31744	---
-1/+5 bar	31649	31666	31689	31722	31745	---
Price €						
0/100 mbar	---	---	---	---	---	---
0/160 mbar	---	---	---	---	31747	31771
0/250 mbar	---	31669	---	---	31748	31772
0/400 mbar	---	31670	---	31726	31749	31773
0/600 mbar	---	31671	31694	31727	31750	31774
Price €						
0/1 bar	---	31672	31695	31728	31751	31775
0/1.6 bar	---	31673	31696	31729	31752	31776
0/2.5 bar	31651	31674	31697	31730	31753	31777
0/4 bar	31652	31675	31698	31731	31754	31778
0/6 bar	31653	31676	31699	31732	31755	31779
0/10 bar	31654	31677	31710	31733	31756	31780
0/16 bar	31655	31678	31711	31734	31757	31781
0/25 bar	31656	31679	31712	31735	31758	31782
Price €						
0/40 bar	31657	31680	31713	31736	31759	---
0/60 bar	31658	31681	---	---	31760	---
0/100 bar	31659	31682	---	---	31761	---
0/160 bar	31660	31683	---	---	31762	---
0/250 bar	31661	31684	---	---	31763	---
0/400 bar	31662	31685	---	---	31764	---
0/600 bar	---	---	---	---	31765	---

Additional costs for pressure transducers

DG: H

Type	DMU 04	DMU 04	DMU 04 CP	DMU 04 MR	DMU 05 P	DMU 05P VM
Version						
	Price €	Price €	Price €	Price €	Price €	Price €
Ex protection II 1 G EEx ia IIC T4						
Clamp 1 1/2" ISO 2852 ($\geq 0/400$ mbar)	---	---	no add.costs	---	---	---
Clamp 2" ISO 2852 ($\geq 0/250$ mbar)	---	---		---	---	---
Conical dairy fitting DIN 11851 DN 40 ($\geq 0/400$ mbar)	---	---	---		---	---
Conical dairy fitting DIN 11851 DN 50 ($\geq 0/250$ mbar)	---	---	---		---	---
Sep. union nut DIN 11851 DN 25	---	---	---		---	---
Sep. union nut DIN 11851 DN 40	---	---	---		---	---
Sep. union nut DIN 11851 DN 50	---	---	---		---	---
G1B with conical seal	---	---	---	---	---	---
Other process connections	on request	on request	on request	on request	on request	on request
High temperature version up to +300 °C					---	---
Food quality pressure transmission liquid					---	---
Weatherpr. housing (stainl. steel 1.4305)					---	---
Weatherproof housing with display (as DA 06)					---	---
„Binder“ plug 723						
Fixed cable connection 2 metres						
Cable extension per metre					---	---
Output 0-20 mA, 3 wires					---	---
Output 0-10 V, 3 wires					---	---
Other output signals	on request	on request	on request	on request	on request	on request
Absolute pressure (measuring ranges according to data sheet)						
Accuracy of measurement 0.25 % FSO					---	---
Calibration certificate (for accuracy of measurement 0.25 % FSO)					---	---
RS 232 interface	---	---	---	---		
Interface and software	---	---	---	---		

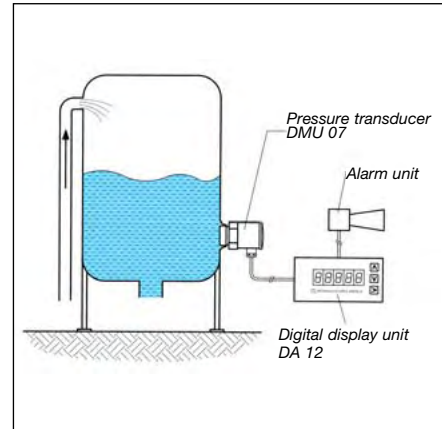
Refer to chapter 14 for digital display units and signal processing.



Pressure transducer DMU 07 for level measurement



Weatherproof housing version
(option)



Application

For continuous electronic level measurement of liquids and pressure measurement of liquids and gases in plant construction.

Description

The DMU 07 pressure transducers are equipped with a ceramic sensor element for capacitive measurement. They feature a calibrated, amplified sensor signal which is available as a standardised current output.

DMU 07 features:

- Flush mounted diaphragm
- Measuring cell without oil filling
- High resistance to chemicals
- Mechanically insensitive ceramic sensor
- Robust and reliable design; also suitable for arduous industrial applications (shock, vibration)
- Excellent long-term stability
- Good temperature characteristics

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 0.35 \% \text{ FSO}$

Measuring ranges

Relative pressure:
0/40 mbar to 0/10 bar

Overpressure safety

$\leq 400 \text{ mbar min. } 8 \times \text{FS}$
 $> 400 \text{ mbar min. } 4 \times \text{FS}$

Operating temperature range

Medium: $-25^\circ\text{C}/+125^\circ\text{C}$
Ambient: $-25^\circ\text{C}/+85^\circ\text{C}$
Storage: $-40^\circ\text{C}/+100^\circ\text{C}$

Temperature error band

In compensated range
 $0/+85^\circ\text{C} \leq 0.1 \% \text{ FSO}/10 \text{ K}$

Dynamic characteristics

Response time $< 200 \text{ ms}$

Process connection

G1½B flush mounted diaphragm

Materials

Housing: stainless steel 1.4305
Pressure-connection: stainless steel 1.4571
Diaphragm: ceramic Al_2O_3 96 %
Seal: FKM (Viton)

Output signal/supply voltage

4-20 mA DC 9-36 V
2-wire
0-10 V DC 14-36 V
3-wire

Load

$4-20 \text{ mA} \leq \frac{U_B (\text{V}) - 9 \text{ V}}{0.02 \text{ A}} [\text{Ohm}]$

0-10 V $> 10 \text{ kOhm}$

Current input

4-20 mA $< 21 \text{ mA}$
0-10 V $< 5 \text{ mA}$

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

Plug and junction box
DIN 43650-A (IP 65)

CE conformity (EMC)

EN 61326

Options

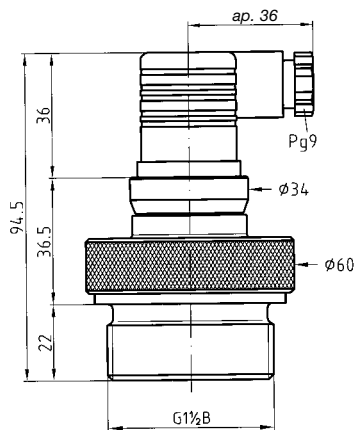
- PVDF pressure connection
- Other seal materials
- Weatherproof housing (stainless steel 1.4305)
- Weatherproof housing with display
- Higher accuracy
- Other output signals

Please refer to chapter 1 for the complete „Level Measurement“ range.

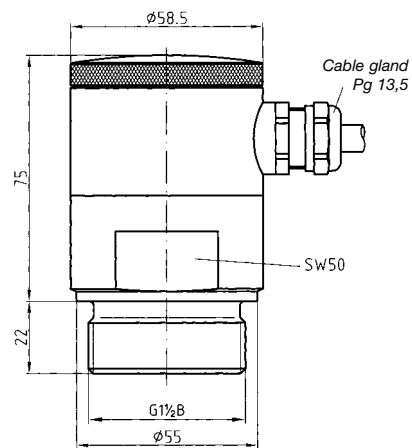
Pressure transducers DMU 07

Dimensions (in mm) and electrical connections

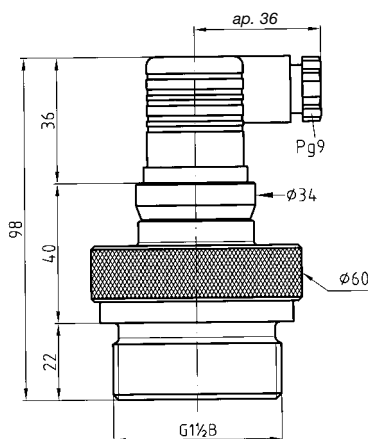
Connection G1½B – plug and junction box DIN 43650-A



Connection G1½B – weatherproof housing

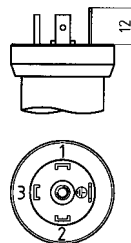


Connection G1½B – PVDF pressure connection

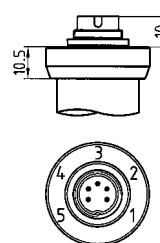


Electrical connections

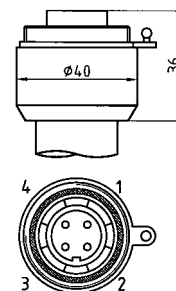
DIN 43650



„Binder“ plug 723



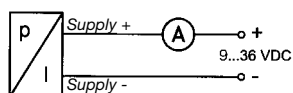
„Buccaneer“ plug



Wiring diagram

2-wire

4-20 mA



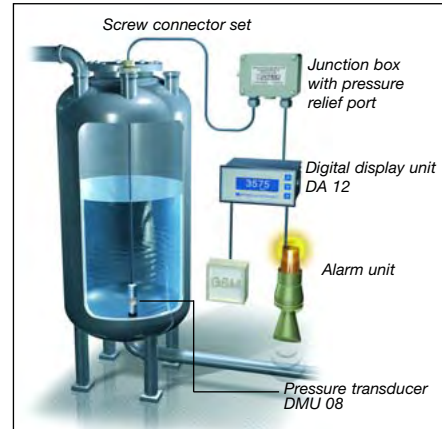
Pin assignment table

			Electrical connections	
			DIN 43650	Cable colours (DIN 47100)
2-wire system:	Supply	+	1	white
	(4-20 mA) Supply	—	2	brown
	Earth		Earth contact	Screen

The units are supplied with a detailed wiring diagram.

Pressure transducers DMU 08

Level probe - stainless steel version



Application

For electronic, continuous level measurement in wells, drilling holes, water reservoirs, containers or in waste water systems.

Description

The DMU 08 pressure transducers use silicon technology and feature calibrated, amplified sensor signals which are available as standardised voltage or current outputs.

Features:

- Compact and robust stainless steel design
- Version with PUR or FEP cable
- Special calibration for all standard pressure units
- Integrated overload protection according to EN 61000-4-5

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 0.35 \% \text{ FSO}$ (ranges 0/100 mbar to 0/400 mbar $< \pm 0.5 \% \text{ FSO}$)

Measuring ranges

0/100 mbar to 0/40 bar
relative pressure

Overpressure safety

Min. 2 x FS
(burst pressure min. 3 x FS)

Operating temperature range

Medium: $-10^{\circ}\text{C}/+70^{\circ}\text{C}$
Ambient: $-10^{\circ}\text{C}/+70^{\circ}\text{C}$
Storage: $-25^{\circ}\text{C}/+70^{\circ}\text{C}$

Temperature error band

In compensated range
 $0-70^{\circ}\text{C} \leq 1 \% \text{ FSO}$
($\leq 0.25 \text{ bar} \leq 2 \% \text{ FSO}$)

Dynamic characteristics

Response time $< 10 \text{ ms}$

Materials

Housing: stainless steel 1.4571
Diaphragm: stainless steel 1.4404
Seals: FKM (Viton)

Pressure transmission liquid

Silicone oil

Supply voltage

DC 12-36 V
Ex version DC 14-28 V

Output signal

4-20 mA, 2-wire

Load

$4-20 \text{ mA} \leq \frac{U_B (\text{V}) - 12 \text{ V}}{0.02 \text{ A}} [\text{Ohm}]$

Current input

4-20 mA $< 25 \text{ mA}$

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

PUR cable (IP 68)

CE conformity (EMC)

EN 61326

Accessories (options)

- Screw connector set
- Junction box
- Lightning protection
- Clamp
- Extension for weight

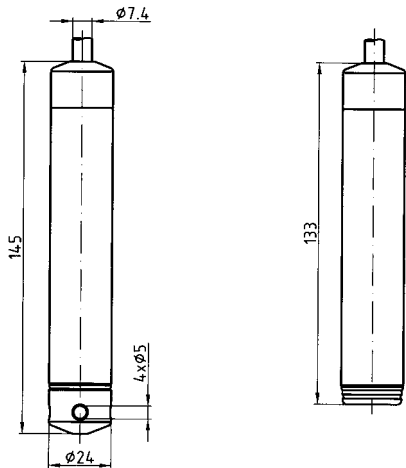
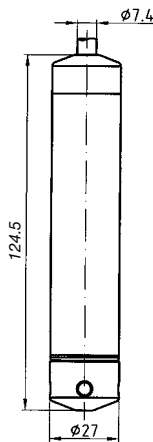
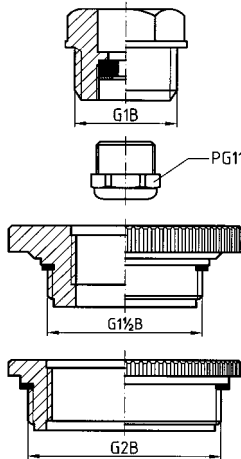
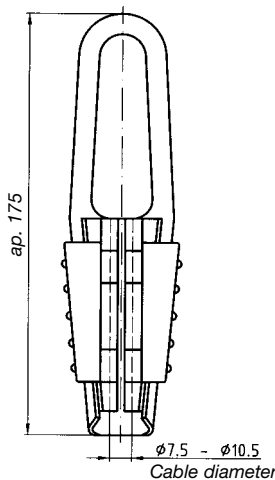
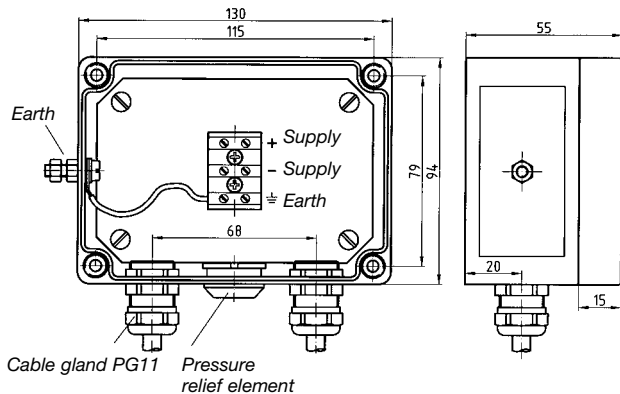
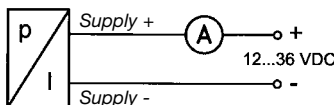
Options

- Ex version (II 1 G EEx ia IIC T4)
- FEP cable
- Higher operating temperature ranges

Please refer to chapter 1 for the complete „Level Measurement“ range.

Pressure transducers DMU 08

Dimensions (in mm) and electrical connections

Standard version 	Ex version 														
Screw connector set  Clamp 	Junction box with pressure relief port 														
Wiring diagram 2-wire 4-20 mA 	Pin assignment table <table><tr><th colspan="3"></th><th>Cable colours (DIN 47100)</th></tr><tr><td rowspan="3">2-wire system:</td><td>Supply</td><td>+</td><td>white</td></tr><tr><td>(4-20 mA) Supply</td><td>-</td><td>brown</td></tr><tr><td>Earth</td><td></td><td>Screen</td></tr></table>				Cable colours (DIN 47100)	2-wire system:	Supply	+	white	(4-20 mA) Supply	-	brown	Earth		Screen
			Cable colours (DIN 47100)												
2-wire system:	Supply	+	white												
	(4-20 mA) Supply	-	brown												
	Earth		Screen												

The units are supplied with a detailed wiring diagram.

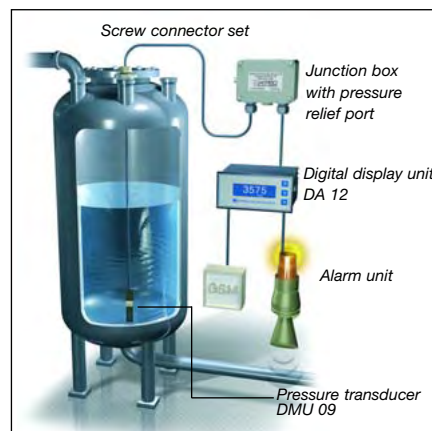
Pressure transducers DMU 09

Level probe - plastic version

DMU 09



Digital display unit



Application

For electronic, continuous level measurement in extremely aggressive liquids such as chemicals or waste water from waste collection plants.

Description

The DMU 09 pressure transducers use capacitance ceramic sensors and feature calibrated, amplified sensor signals which are available as standardised current outputs.

DMU 09 features:

- Chemical resistant plastic version made of PVC
- Highly resistant FEP cable
- Robust, insensitive ceramic diaphragm
- Special calibration for all standard pressure units (option)

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 0,35 \% \text{ FSO}$

Measuring ranges

0/40 mbar to 0/10 bar relative pressure

Overpressure safety

$\leq 400 \text{ mbar min. } 8 \times \text{FS}$
 $> 400 \text{ mbar min. } 4 \times \text{FS}$

Operating temperature range

Medium: $0^\circ\text{C}/+50^\circ\text{C}$
 Ambient: $0^\circ\text{C}/+50^\circ\text{C}$
 Storage: $-10^\circ\text{C}/+50^\circ\text{C}$

Temperature error band

In compensated range
 $0-80^\circ\text{C} \leq 0.1 \% \text{ FSO}/10 \text{ K}$

Dynamic characteristics

Response time $< 200 \text{ ms}$

Materials

Housing: PVC
 Diaphragm: ceramic Al_2O_3 96 %
 Seals: FKM (Viton)

Output signal/supply voltage

4-20 mA DC 9-36 V
 2-wire

Load

$4-20 \text{ mA} \leq \frac{U_B (\text{V}) - 12 \text{ V}}{0.02 \text{ A}} [\text{Ohm}]$

Current input

4-20 mA $< 25 \text{ mA}$

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

FEP cable (IP 68)

CE conformity (EMC)

EN 61326

Accessories (optional)

- Screw connector set
- Junction box
- Lightning protection
- Clamp

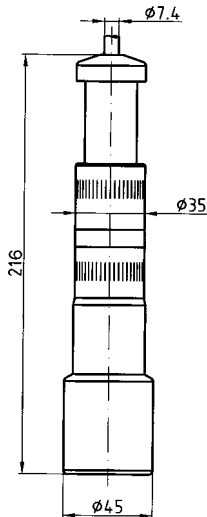
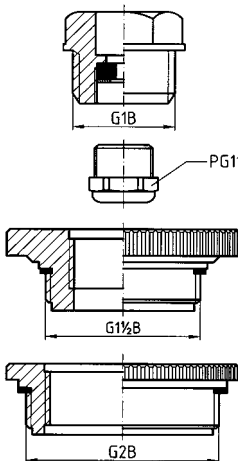
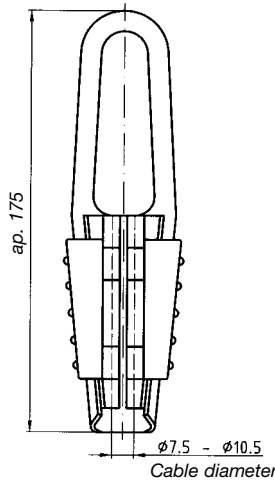
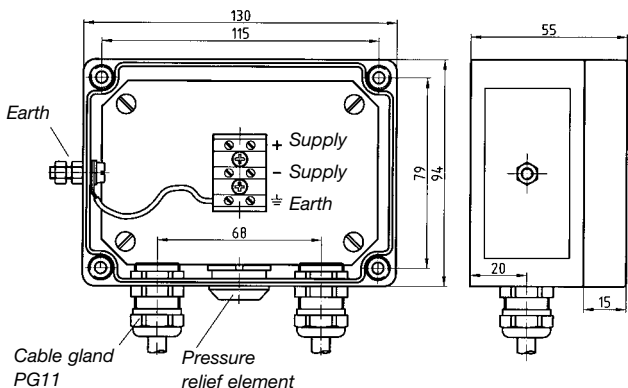
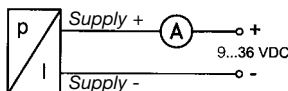
Options

- Other materials
- Flexible conduit cable protection

Please refer to chapter 1 for the complete „Level Measurement“ range.

Pressure transducers DMU 09

Dimensions (in mm) and electrical connections

															
Screw connector set  Clamp 	Junction box with pressure relief port 														
Wiring diagram 2-wire 4-20 mA 	Pin assignment table <table><tr><th colspan="3"></th><th>Cable colours (DIN 47100)</th></tr><tr><td rowspan="3">2-wire system: (4-20 mA)</td><td>Supply</td><td>+</td><td>white</td></tr><tr><td>Supply</td><td>-</td><td>brown</td></tr><tr><td>Earth</td><td></td><td>Screen</td></tr></table>				Cable colours (DIN 47100)	2-wire system: (4-20 mA)	Supply	+	white	Supply	-	brown	Earth		Screen
			Cable colours (DIN 47100)												
2-wire system: (4-20 mA)	Supply	+	white												
	Supply	-	brown												
	Earth		Screen												

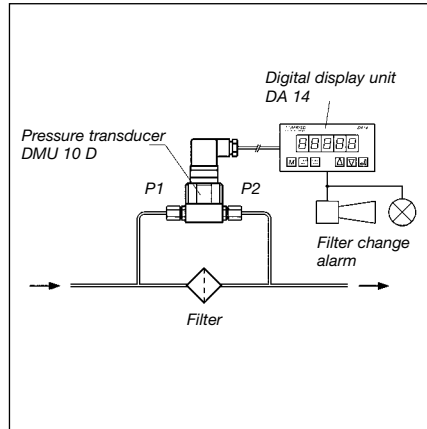
The units are supplied with a detailed wiring diagram.

Pressure transducers DMU 10 D

Differential pressure version



DMU 10 D



DMU 10 D with plug-in display DA 06



Application

For electronic differential pressure measurements at very low differential pressure. For non-corrosive gaseous media. Particularly suitable for monitoring filters and fans in air moving and air conditioning equipment.

Description

The DMU 10 D pressure transducers feature piezo-resistive silicon measuring cells. When pressure is applied, the pressure difference between the positive side and the negative side is converted into a current or voltage signal which is proportional to the differential pressure.

DMU 10 features:

- Robust aluminium housing
- Compact design
- Long service life
- Excellent long-term stability
- High overpressure safety
- Plug-in display DA 06 for local indication on site and switching output (optional)

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability):

> 0/160 mbar:	≤ ±0.35 % FSO
0/40-0/160 mbar:	≤ ±1 % FSO
< 0/40 mbar:	≤ ±2 % FSO

Long-term stability

≤ ±0.2 % FSO/year

Measuring ranges/overpressure safety

Differential pressure range	Max. static pressure
0/6 mbar to 0/10 mbar	100 mbar
0/25 mbar	200 mbar
0/40 mbar to 0/60 mbar	350 mbar
0/100 mbar to 0/400 mbar	1,000 mbar
0/600 mbar to 0/1,000 mbar	3,000 mbar

Operating temperature range

Medium:	-25 °C/+125 °C
Ambient:	-25 °C/ +85 °C
Storage:	-40 °C/+100 °C

Temperature error band

Differential pressure range	In compensated range 0/60 °C
≤ 0/10 mbar	≤ ±2 % FSO
≤ 0/25 mbar	≤ ±1.5 % FSO
≤ 0/250 mbar	≤ ±1 % FSO
> 0/250 mbar	≤ ±0.5 % FSO

Dynamic characteristics

Response time < 5 ms

Process connection

2 x G1/8 female thread

Materials

Housing:	aluminium
Process-connection:	aluminium
Sensor:	silicon, glass, RTV, ceramic, Al ₂ O ₃ , nickel
Seal:	PUR glued

Output signal/supply voltage

4-20 mA	DC 12-36 V
2-wire	
0-20 mA	DC 14-36 V
3-wire	
0-10 V	DC 14-36 V
3-wire	

Load

$$4-20 \text{ mA} \leq \frac{U_B (\text{V}) - 12 \text{ V} [\Omega]}{0.02 \text{ A}}$$

$$0-20 \text{ mA} = 500 \text{ Ohm}$$

$$0-10 \text{ V} = 10 \text{ kOhm}$$

Current input

0/4-20 mA	max. 25 mA
0-10 V	max. 7 mA

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

Plug and junction box
DIN 43650-A (IP 65)

CE conformity (EMC)

EN 61326

Options

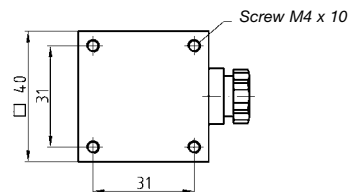
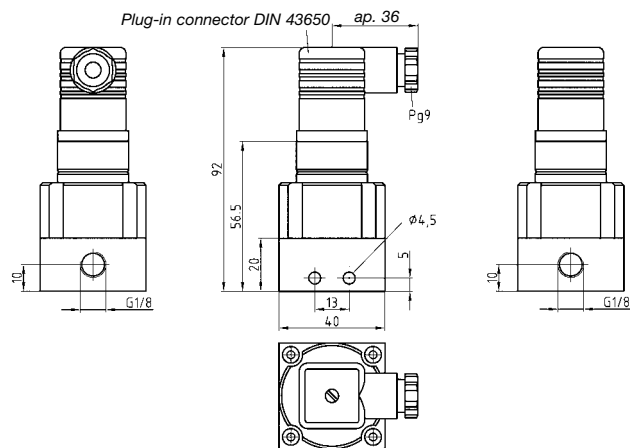
- Other process connections
- Other electrical connections
- Digital plug-in display DA 06

Pressure transducers DMU 10 D

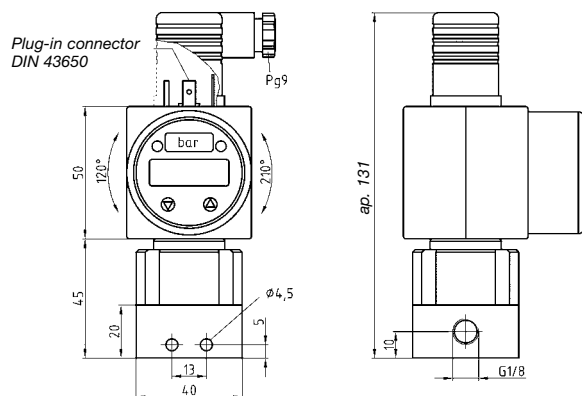
Dimensions (in mm) and electrical connections



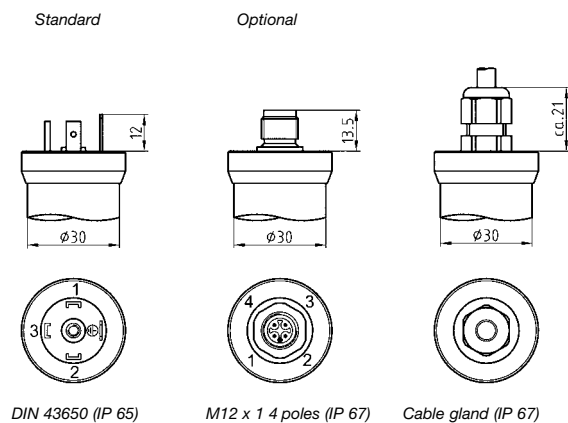
Connection 2 x G1/8 female thread



DMU 10 D with plug-in display DA 06



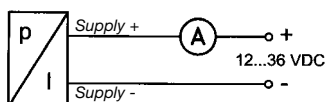
Electrical connections



Wiring diagram

2-wire

4-20 mA



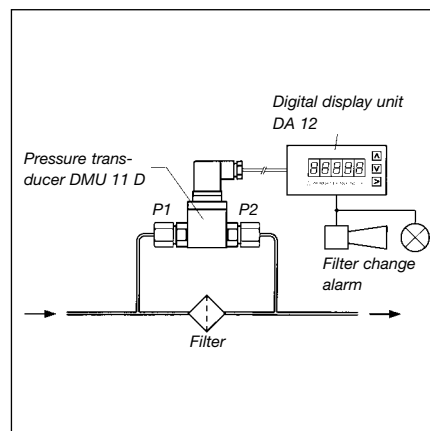
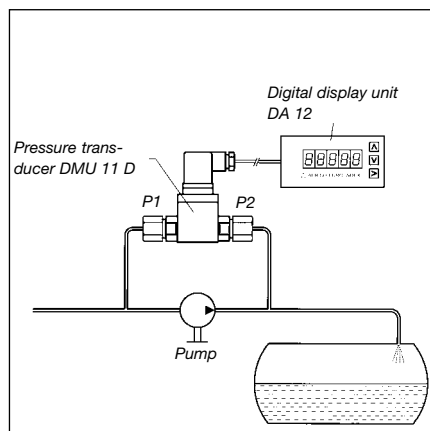
Pin assignment table

Assignment	DIN 43650
2-wire system: Supply +	1
(4-20 mA) Supply -	2
Earth	Earth contact

The units are supplied with a detailed wiring diagram.

Pressure transducers DMU 11 D

Differential pressure version



Application

For electronic differential pressure measurement in industrial applications. For aggressive gaseous and liquid media, which are not highly viscous and do not crystallize.

Description

The DMU 11 D pressure transducers feature two piezo-resistive stainless steel measuring cells. When pressure is applied, the pressure difference between the positive side and the negative side is converted into a current signal, which is proportional to the differential pressure.

Features:

- High overload safety
- Compact design
- Overvoltage protection
- Mechanically robust and reliable, suitable for use in applications where vibration or shocks occur

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): < +0.5 % FSO

Measuring ranges/overload safety

Nominal pressure (bar)	Diff. pressure range (bar)	Max. static pressure on one side (bar)
0.4	0/0.04 up to 0/0.4	1
1.0	0/0.1 up to 0/1.0	3
2.5	0/0.25 up to 0/2.5	6
6.0	0/0.6 up to 0/6.0	20
16	0/1.6 up to 0/16	60

Operating temperature range

Medium: -25 °C/+125 °C
Ambient: -25 °C/ +85 °C
Storage: -40 °C/+100 °C

Temperature error band

In compensated range
0-70 °C ≤ 1.5 % FSO

Dynamic characteristics

Response time < 5 ms

Process connection

2 x G¹/₂B (EN 837-1/7.3)

Materials

Housing: aluminium
Pressure-connection: stainless steel 1.4571
Diaphragm: stainless steel 1.4435
Seal: FKM (Viton)

Output signal/supply voltage

4-20 mA DC 12-36 V
2-wire

Load

4-20 mA ≤ $\frac{U_B (V) - 12 V}{0.02 A}$ [Ohm]

Current input

4-20 mA < 25 mA

Protective electrical measures

Short circuit proof and polarity protected

Electrical connections (protection)

Plug and DIN 43650-A (IP 65)

CE conformity (EMC)

EN 61326

Accessories

- Fixing bracket (included)

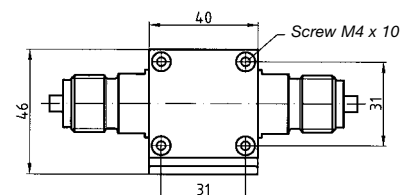
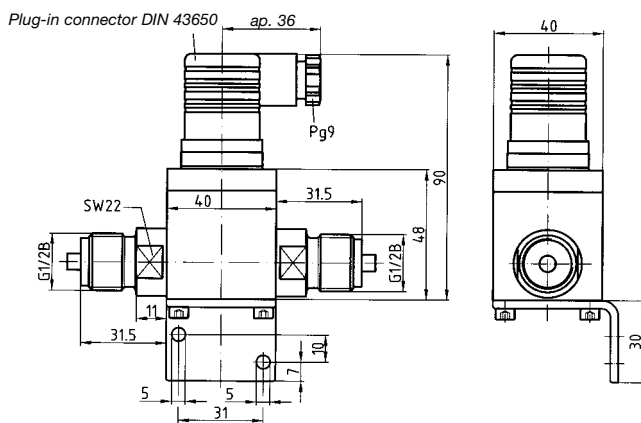
Options

- Other process connections
- Other electrical connections
- Other seal materials
- Fitting of diaphragm seal

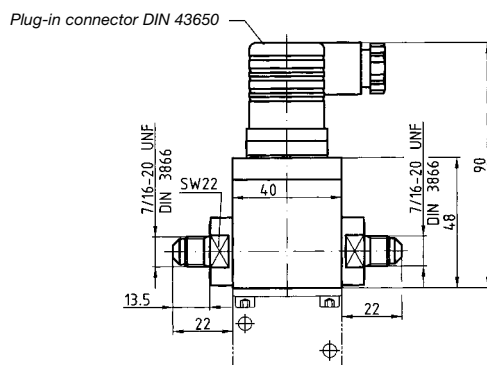
Pressure transducers DMU 11 D

Dimensions (in mm) and electrical connections

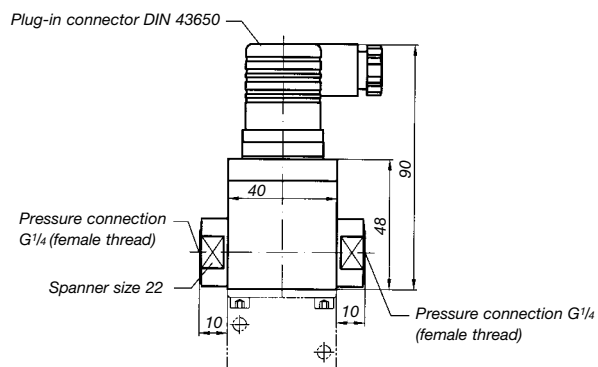
Connection 2 x G $\frac{1}{2}$ B EN 837



Connection 2 x 7/16 UNF



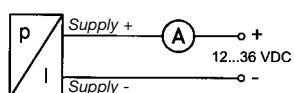
Connection 2 x G $\frac{1}{4}$ female thread



Wiring diagram

2-wire

4-20 mA



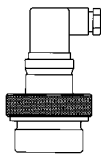
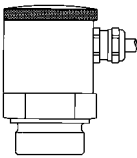
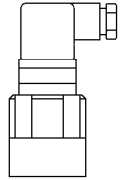
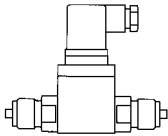
Pin assignment table

Assignment	DIN 43650
2-wire system: Supply +	1
(4-20 mA) Supply -	2
Earth	Earth contact

The units are supplied with a detailed wiring diagram.

Pressure transducers

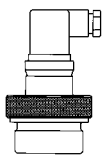
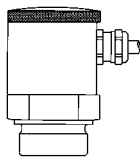
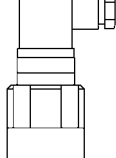
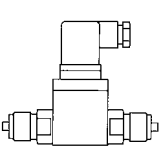
DG: H

Type	DMU 07	DMU 07 FG	DMU 08	DMU 09	DMU 10 D	DMU 11 D*
Version						
Measuring principle	Capacitance ceramic measuring cell		Piezo-resistive stainl. steel measuring cell	Capacitance ceramic measuring cell	Piezo-resistive silicon measuring cell	Piezo-resistive stainl. steel measuring cell
Accuracy (IEC 60770)	0.35 % FSO	0.35 % FSO	0.35 % FSO (≤0.4 bar 0.5 % FSO)	0.35 % FSO	>160 mbar = 0.35 % FSO 40-160 mbar = 1 % FSO <40 mbar = 2 % FSO	0.5 % FSO (with ref. to nom. pressure)
Wetted parts	Ceramic/stainless steel 1.4571	Ceramic/stainless steel 1.4571	Stainless steel 1.4571/1.4404	PVC/ceramic	Alu/silicon/glass RTV/ceramic, nickel/PUR (glued)	Stainless steel 1.4571/1.4435
Connection	G1 1/2B with flush mounted diaphragm	G1 1/2B with flush mounted diaphragm			2 x G1/8 female thread	2 x G1/2B EN 837
Supply voltage	DC 9-36 V	DC 9-36 V	DC 12-36 V	DC 9-36 V	DC 12-36 V	DC 12-36 V
Output	4-20 mA	4-20 mA	4-20 mA	4-20 mA	4-20 mA	4-20 mA
System	2-wire	2-wire	2-wire	2-wire	2-wire	2-wire
Electrical connection	plug DIN 43650-A	Weatherpr. housing PG 13.5	5 m PUR cable	5 m FEP cable	plug DIN 43650-A	plug DIN 43650-A
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
0/6 mbar	---	---	---	---	31861	---
0/10 mbar	---	---	---	---	31862	---
0/25 mbar	---	---	---	---	31863	---
0/40 mbar	31789	31821	---	31767	31864	31830
0/60 mbar	31790	31805	---	31768	31865	31831
0/100 mbar	31791	31547	31555	31571	31866	31813
0/160 mbar	31792	31806	31556	31572	31867	31814
0/200 mbar	31793	31548	31557	31573	---	---
0/250 mbar	31794	31807	31558	31574	31868	31815
0/300 mbar	---	---	31519	31812	---	---
0/400 mbar	31795	31549	31559	31575	31869	31832
0/600 mbar	31796	31808	31560	31576	31870	31833
0/1 bar	31797	31550	31561	31577	31871	31816
0/1.6 bar	31798	31809	31562	31578	---	31834
0/2 bar	31799	31551	31563	31579	---	---
0/2.5 bar	---	---	31564	31580	---	31817
0/4 bar	31800	31552	31565	31581	---	31835
0/6 bar	31801	31810	31566	31582	---	31818
0/10 bar	31802	31553	31567	31583	---	31836
0/16 bar	---	---	31568	---	---	31837
0/20 bar	---	---	31569	---	---	---
0/25 bar	---	---	31570	---	---	---
0/40 bar	---	---	31766	---	---	---

* Please specify required nominal pressure/maximum static pressure when ordering.

Additional costs for pressure transducers accessories

DG: H

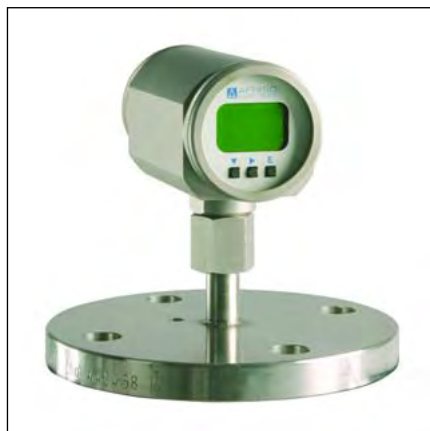
Type	DMU 07	DMU 07 FG	DMU 08	DMU 09	DMU 10 D	DMU 11 D
Version						
	Price €	Price €	Price €	Price €	Price €	Price €
Ex protection II 1 G EEx ia IIC T4	---	---	---	---	---	---
2 x G ¹ / ₄ female thread	---	---	---	---	---	on request
2 x capillary connection 6 mm	---	---	---	---	---	on request
2 x ⁷ / ₁₆ UNF	---	---	---	---	---	---
Other connections	on request	on request	---	---	on request	on request
Cable connection per metre PUR cable	---	---	---	---	---	---
Cable connection per metre FEP cable	---	---	---	---	---	---
Extension for weight	---	---	on request	---	---	---
Weatherproof housing with display (DA 06)	---	---	---	---	---	---
„Binder“ plug	---	---	---	---	---	---
Fixed cable connection 2 metres	---	---	---	---	---	---
Cable extension per metre	---	---	---	---	---	---
Output 0-20 mA, 3 wires	---	---	---	---	---	---
Output 0-10 V, 3 wires	---	---	---	---	---	---
Other output signals	on request	on request	on request	on request	on request	on request
Absolute pressure	---	---	---	---	---	---
Accuracy of measurement 0.25 % FSO	---	---	---	---	---	---
Calibration certificate (for accuracy of measurement 0.25 % FSO)	---	---	---	---	---	---

Accessories for DMU 08/09

DG: H

	Part no.	Price €
Screw connector set plastic G2" – 1 ¹ / ₂ " – 1"	52125	
Screw connector set stainless steel G1"	31822	
Adapter stainless steel G1" to G1 ¹ / ₂ "	31823	
Junction box with pressure relief port (IP 65)	31824	
Tensioning clamp	31825	

Intelligent pressure transducers with microprocessor DMU 12



Application

For high accuracy electronic measurement of pressure or differential pressure, with integrated digital display. The robust design renders this unit suitable for use under arduous operating conditions in the chemical industry, process technology as well as the food and feed-stuffs industry.

Description

The DMU 12 pressure transducer features a calibrated, amplified sensor signal which is available as a standardised current output.

DMU 12 is available in the following versions:

- Relative, absolute or differential pressure versions
- With threaded connection, flange connection EN 61518, relief/stop valve, fitted diaphragm seals
- Level measurement version with parameter tables

Menu types

Refer to table on page 441.

Graphic display

Text orientated menu guide

Display modes (standard):

Measured value and pressure unit plus choice of the following:

1. Bar chart
2. Sensor temperature
3. Measured value expressed as a percentage
4. Output current in mA

Mounting position

Any position; housing can be rotated by 170° to the left or to the right, allowing the display and control panel to be factory pre-set at angles of 90°, 180° or 270°, as required.

Accuracy of measurement

< 0/200 bar ≤ ±0.2 % FSO
≥ 0/200 bar ≤ ±0.5 % FSO

Measuring ranges

Refer to table on page 441.

Range selection/range spread

User adjustable without test bed
Maximum 1:20
(differential pressure, max. 1:10)

Operating temperature range

Medium: -10 °C/+90 °C
Ambient: -10 °C/+55 °C
Storage: -20 °C/+60 °C
TC zero point: < ±0.1 %/10 K

Dynamic characteristics

Suitable for static and dynamic measurements

Measuring cycle max. 0.5 s
(0.8 s with HART protocol)

Process connection

Stainless steel 1.4404
G1/2B (EN 837-1/7.3)

Wetted parts

Stainless steel 1.4404

Pressure transmission liquid

Silicone oil

Output signal/supply voltage

4-20 mA DC 12-50 V

2-wire

(optional with HART protocol)

Short circuit proof and polarity protected

max. ± supply voltage

Load

4-20 mA ≤ $\frac{U_B (V) - 12 V}{0.02 A}$ [Ohm]

Current input

4-20 mA max. 20 mA

Housing (protection)

Stainless steel 1.4305 (IP 65),
safety front glass (display)

Electrical connections

Cable gland

CE conformity (EMC)

EN 50081-1 and EN 50082-2

Options

- HART protocol
- Differential pressure version
- Level version
- Fitting of diaphragm seal
- Bracket for wall mounting
- Ex version
(II 2 G EEx ia II C T4/T5/T6)

Intelligent pressure transducers with microprocessor DMU 12

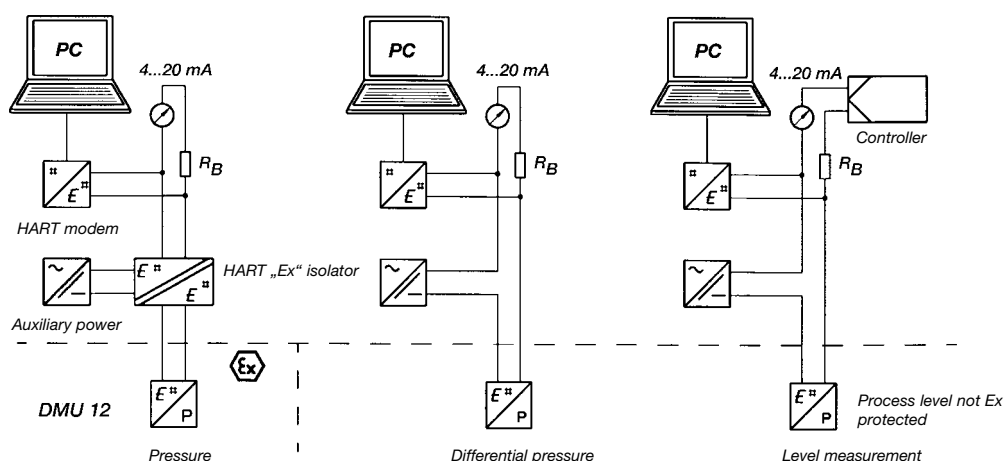
Menu types

The following menus are available for displaying information and selecting parameters:

Menu type	Meaning	Menu type	Meaning
Measuring range selection	Specify min. and max. pressure range, without actual pressure	Alarm condition	Specify output current for fault or malfunction
Damping	Select signal damping	Calibrate	Specify min. and max. pressure range, with pressure
Min./max. values	Display of min./max. values for pressure, level measurement and temperature	Current balancing	Adapt output signal to connected instruments
Signal evaluation	Select transmission mode	Factory defaults	Re-set to factory defaults
Pressure units	Selection of physical unit with conversion	Security lock	Protection against unauthorised use
Measurement cycle test	Create a defined output signal		

Measuring ranges	Overpressure safety	Measuring ranges	Overpressure safety (on one side)	Max. static pressure
Relative pressure:		Differential pressure:		
-1/ +1 bar	-1/ +6 bar	0/ 1 bar	6 bar	75 bar
-1/ +4 bar	-1/ +10 bar	0/ 4 bar	10 bar	75 bar
-1/ +16 bar	-1/ +30 bar	0/16 bar	30 bar	75 bar
-1/ +40 bar	-1/ +75 bar			
-1/+100 bar	-1/+200 bar			
-1/+400 bar	-1/+500 bar			
Absolute pressure:				
0/ 1 bar	6 bar			
0/ 4 bar	10 bar			
0/16 bar	30 bar			

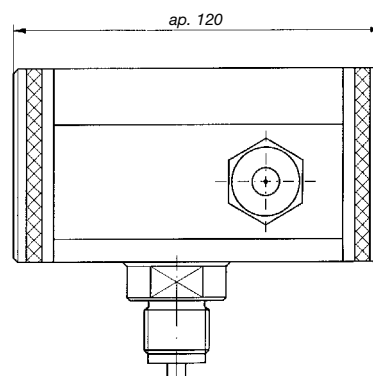
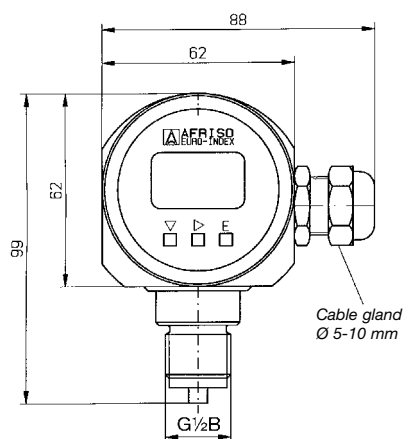
Function diagram with HART protocol



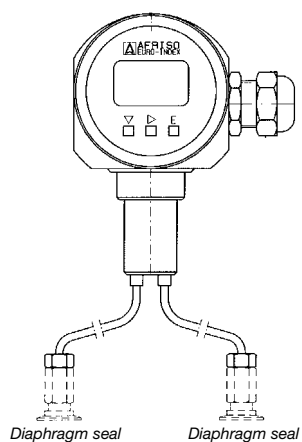
Pressure transducers DMU 12

Types and dimensions (in mm)

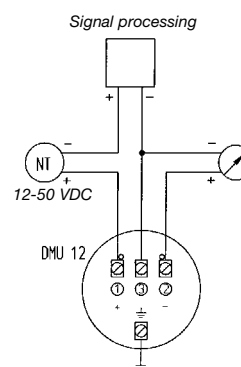
Standard version - connection G $\frac{1}{2}$ B



Differential pressure version - diaphragm seal fitted

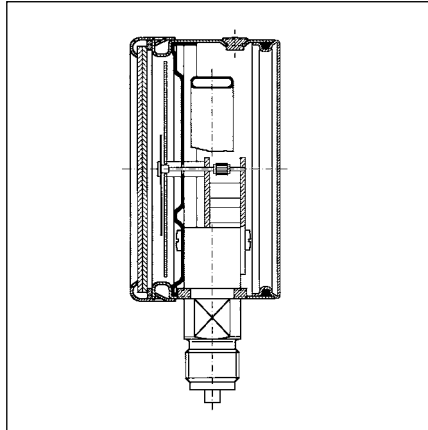
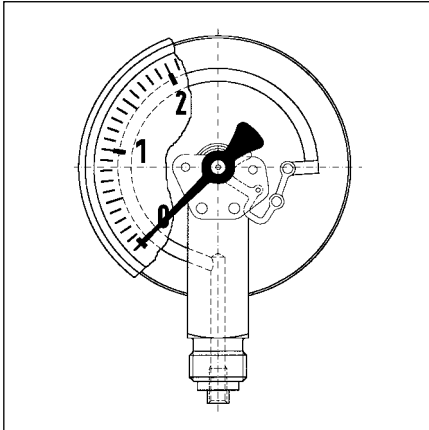


Wiring diagram



Pressure transducers with local display

DMU 13



Application

For pressure measurements with a power-independent local display in combination with an electrical output signal.

Description

The DMU 13 pressure transducers consist of a mechanical Bourdon tube measuring element and a piezo-resistive stainless steel measuring cell. The Bourdon tube measuring element is used to provide an easy-to-read local display. The display is power-independent. Due to the integrated pressure transducer, a high accuracy measurement in parallel is possible. A standardised current output is available for signal transmission and recording of measured data. The robust stainless steel housing has a solid baffle wall and blow-out (safety housing).

Technical specifications

Nominal size

100

Accuracy of measurement

Pressure gauge:

Class 1.0 (EN 837-1/6)

Pressure transducer:

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 0.35 \% \text{ FSO}$

Measuring ranges

0/0.6 to 0/40 bar

Application area

Static load:

Full scale value

Dynamic load:

0.9 x full scale value

Short term:

1.3 x full scale value

Operating temperature range

Medium: $-20^{\circ}\text{C}/+100^{\circ}\text{C}$

Ambient: $-20^{\circ}\text{C}/+60^{\circ}\text{C}$

Storage: $-40^{\circ}\text{C}/+70^{\circ}\text{C}$

Housing

with solid baffle wall and blow-out

Front glass

Laminated safety glass

Protection

IP 54 (EN 60529)

Process connection

G $\frac{1}{2}$ B - spanner size 22,

bottom back (EN 837-1/7.3)

Materials

Housing: stainless steel 1.4301

Pressure-

connection: stainless steel 1.4571

Diaphragm: stainless steel 1.4404

Seal: FKM (Viton)

Electrical connection

Junction box

Additional data transducer

Output signal/supply voltage

4-20 mA DC 12-36 V

2-wire

Load

$4-20 \text{ mA} \leq \frac{U_B (V) - 12 V}{0.02 A} [\text{Ohm}]$

Current input

$4-20 \text{ mA} < 25 \text{ mA}$

Long-term stability

$\leq \pm 0.2 \% \text{ FSO/year}$

Temperature error band

in compensated range

$0-70^{\circ}\text{C} \leq 1 \% \text{ FSO}$

Pressure transmission liquid

Silicone oil

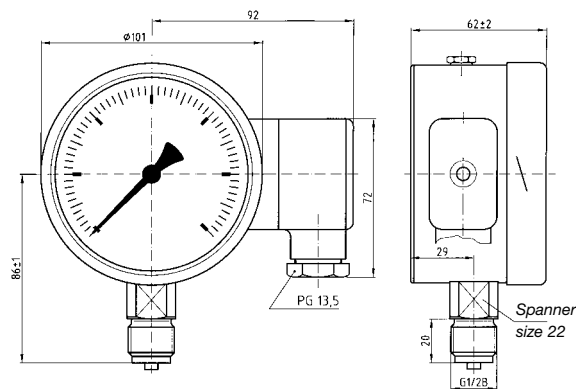
Options

- Liquid filling (silicone oil)
- Electrical contacts
- Other process connections
- Diaphragm seal fitting

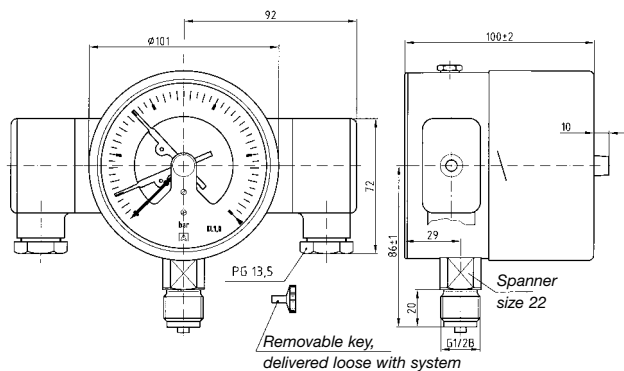
Pressure transducers with local display DMU 13

Types and dimensions (in mm)

Bottom connection



Bottom connection, with electrical contact

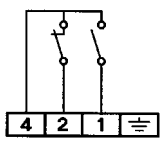


Pin assignment table for pressure measuring cell (right hand junction box)

Supply +	1
Supply -	2
Earth	Earth pin

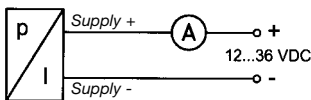
Pin assignment table for electrical contact (left hand junction box)
Example: Magnetic spring contact MK2.12

Normally open contact	1
Normally closed contact	2
Common (+ve)	4



Wiring diagram

2-wire



Intelligent pressure transducers DMU 14



DMU 14 FG with clamp connection



DMU 14 FG with display



DMU 14 DG with display



Application

For electronic pressure measurement in applications requiring high accuracy of measurement and long-term stability, especially under arduous operating conditions. With aluminium die cast housing, the units are particularly suitable for process technology applications. With stainless steel weatherproof housing and hygienic process connection, the units are ideally suited for applications in the food and beverage industries.

Description

The DMU 14 pressure transducers use piezo-resistive stainless steel measuring cells and feature calibrated, amplified sensor signals which are available as standardised current outputs.

DMU 14 features:

- Robust housing versions
- High accuracy
- Long service life
- High long-term stability
- High overpressure safety
- Turn Down 1:5
- Display (optional)
- HART communication (optional)
- Ex version (optional)

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability)

250 mbar: $\leq \pm 0.2 \% \text{ FSO}$
 > 0/1 bar: $< \pm 0.1 \% \text{ FSO}$

Long-term stability

$\leq \pm 0.15 \% \text{ FSO/year}$

Meas. ranges/overpressure safety

Measuring range	Max. overpressure
0/ 250 mbar	1,000 mbar
0/1 bar	3 bar
0/1.6 bar	6 bar
0/6 bar	20 bar
0/16 bar	60 bar
0/25 bar	100 bar
0/60 bar	140 bar
0/160 bar	340 bar
0/250 bar	600 bar
0/600 bar	1,000 bar

Operating temperature range

Without display

Medium: $-40\text{ }^{\circ}\text{C}/+125\text{ }^{\circ}\text{C}$

Ambient: $-40\text{ }^{\circ}\text{C}/+80\text{ }^{\circ}\text{C}$

Storage: $-40\text{ }^{\circ}\text{C}/+80\text{ }^{\circ}\text{C}$

With display

Medium: $-40\text{ }^{\circ}\text{C}/+125\text{ }^{\circ}\text{C}$

Ambient: $-20\text{ }^{\circ}\text{C}/+70\text{ }^{\circ}\text{C}$

Storage: $-30\text{ }^{\circ}\text{C}/+80\text{ }^{\circ}\text{C}$

Temperature error

0.1 % FSO/10 K

Dynamic characteristics

Response time < 200 ms

Process connection

G $\frac{1}{2}$ B (EN 837-1/7.3)

Materials

Housing: Stainless steel 1.4301
or aluminium die cast

Process-connection: stainless steel 1.4571

Diaphragm: stainless steel 1.4435

Seal: FKM, NBR for $\geq 35 \text{ bar}$

Adjustable parameters

Electronic damping: 0/100 s

Offset: 0/90 %

Turn down (of span): 1:5

Output signal/supply voltage

4-20 mA, 2-wire DC 10-30 V

4-20 mA, 2-wire DC 10-28 V

with Ex version/

HART communication

Load

$R_{\text{max}} = [(U_B - U_{B\text{min}})/0.02] \Omega$

HART-Kommunikation $R_{\text{min}} = 250 \Omega$

Current input

4-20 mA max. 25 mA

Protective electrical measures

Short circuit proof and polarity protected

Electrical connection (protection)

Connection terminals in terminal chamber (IP 67)

CE conformity (EMC)

EN 61326

Options

- Other process connections
- Ex version with HART communication
- High temperature version
- Integrated local display

Intelligent pressure transducers DMU 14

Dimensions (in mm) and electrical connections

DMU 14 FG 1½" with and without local display

DMU 14 FG clamp 1½" with and without local display

DMU 14 DG

DMU 14 DG

Wiring diagrams

Pin assignment table

	Stainless steel weatherproof housing	Aluminium die cast housing
	Connection terminals	Connection terminals
Supply +	1	2
Supply -	2	4
Test	-	3
Earth	6	1

By connecting an ammeter between supply + and test terminals, the output signal can be checked without disconnecting the supply voltage.

Universal digital pressure gauge DIM 10



Clamp connection (optional)



Clamp connection and temperature decoupler (optional)



Application

For high accuracy electronic pressure measurement with local digital display and use in applications such as hydraulics, pneumatics, machine and plant construction, gas and the medical technology field.

Description

Compact microprocessor controlled pressure gauge with thick-film ceramic measuring cell. The microprocessor processes the signal received from the pressure sensor, converts it into the desired unit and displays it. Due to its modular design, the pressure gauge can be adapted in many ways to suit customer-specific requirements.

Functions

Selection of measurement units, zero correction, password, push-to-read, battery status indication

Displayed values

Selectable pressure units:
bar/psi/MPa/mWC

Display

4-digit, 12 mm high, 7-segment LCD with additional symbols, can be rotated by 330°

Accuracy of measurement

Deviation characteristics according to IEC 60770 - limit point setting (non-linearity, hysteresis, repeatability): $< \pm 0.5 \% \text{ FSO}$ (measuring range $-1/0 \text{ bar} < \pm 1 \% \text{ FSO}$)

Measuring ranges

$-1/0 \text{ bar}$,
 $0/1 \text{ bar}$ to $0/400 \text{ bar}$

Overpressure safety

$\leq 160 \text{ bar min. } 2 \times \text{FS}$
 $> 160 \text{ bar min. } 1.5 \times \text{FS}$

Burst pressure

Min. $3 \times \text{FS}$

Operating temperature range

Medium: $-25^\circ\text{C}/+125^\circ\text{C}$
Ambient: $0^\circ\text{C}/+45^\circ\text{C}$
Storage: $-30^\circ\text{C}/+80^\circ\text{C}$

Temperature error

In compensated range
 $0-70^\circ\text{C} \leq 2 \% \text{ FSO}$

Dynamic characteristics

Suitable for static and dynamic measurements
Scanning rate 1/s

Process connection

G $1/4$ B (EN 837-1/7.3) bottom

Materials

Housing: PA6, glass reinforced
Pressure-connection: stainless steel
1.4305/1.4571
Diaphragm: ceramic Al_2O_3 , 96 %
Seal: NBR

Protection

IP 51 (EN 60529)

Supply voltage

1 x lithium battery 3.6 V (included), battery life depends on usage (max. 8 years)

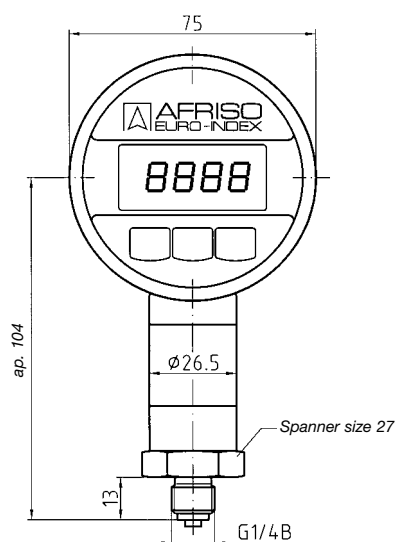
Options

- Other process connections
- Hygienic process connections
- Temperature decoupler (up to T_{max} medium 150°C)
- Diaphragm seal fitting

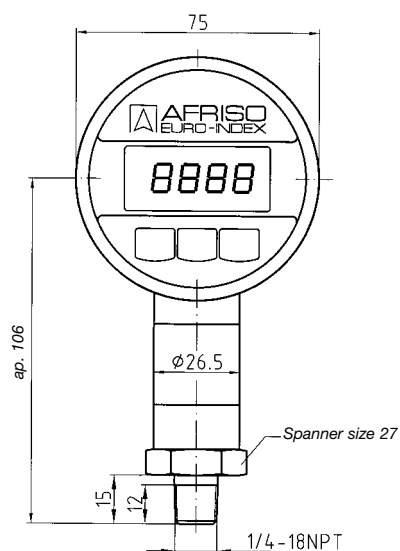
Digital pressure gauge DIM 10

Types and dimensions (mm)

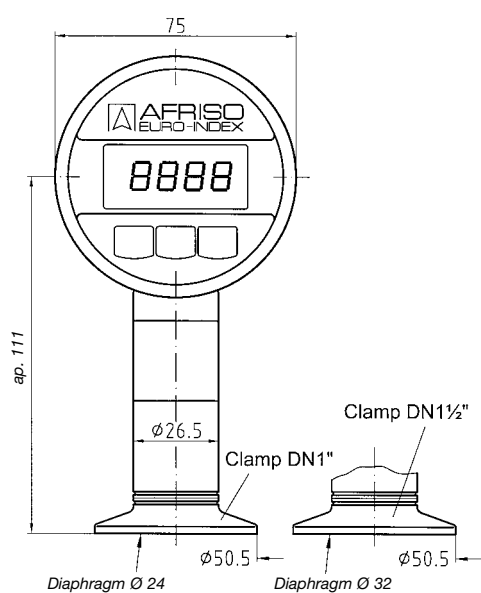
Connection G $\frac{1}{4}$ B EN 837



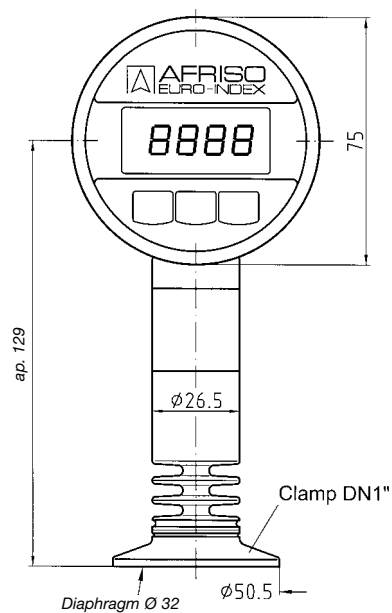
Connection $\frac{1}{4}$ -NPT



Clamp connections ISO 2852

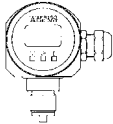
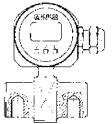
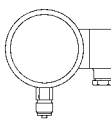
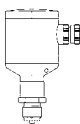
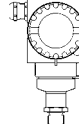


Clamp connection ISO 2852 with temperature decoupler (T_{max} medium 150 °C)



Pressure transducers/digital pressure gauge

DG: H

Type	DMU 12	DMU 12 Dif	DMU 13	DMU 14 FG	DMU 14 DG	DIM 10
Version						
Housing-Ø	62	62	100	60	75	75
Housing	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Aluminium	Plastic
Accuracy	0.2 % FSO	0.2 % FSO	0.35 % FSO	refer to data sheet	refer to data sheet	0.5 % FSO
Wetted parts	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4571/1.4404	Stainless steel 1.4571/1.4435	Stainless steel 1.4571/1.4435	Stainless steel 1.4305/Ceramic
Connection	G ¹ / ₂ B	EN 61518	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₂ B	G ¹ / ₄ B
Supply voltage	DC 12-50 V	DC 12-50 V	DC 12-36 V	DC 10-30 V	DC 10-30 V	DC 3.6 V
Output	4-20 mA	4-20 mA	4-20 mA	4-20 mA	4-20 mA	---
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
0/250 mbar	---	---	---	31977	31987	---
Price €						
-1/0 bar	---	---	---	---	---	31060
0/0.6 bar	---	---	31076	---	---	---
0/1 bar	31040*	31049	31077	31978	31988	31061
Price €						
0/1.6 bar	---	---	31078	31979	31989	32051
0/2.5 bar	---	---	31079	---	---	31062
0/4 bar	31041*	31050	31080	---	---	31063
0/6 bar	---	---	31081	31980	31990	31064
0/10 bar	---	---	31082	---	---	31065
0/16 bar	31042*	31051	31083	31981	31991	31066
0/25 bar	---	---	31084	31982	31992	31067
0/40 bar	31043*	---	31085	---	---	31068
Price €						
0/60 bar	---	---	---	31983	31993	31069
0/100 bar	31044*	---	---	---	---	31070
0/160 bar	---	---	---	31984	31994	31071
0/250 bar	---	---	---	31985	31995	31072
0/400 bar	31045*	---	---	---	---	31073
0/600 bar	---	---	---	31986	31996	---
Add. costs**	Price €	Price €	Price €	Price €	Price €	Price
Ex protection with HART communication	on request	on request	---			---
Liquid filling	---	---	---	---	---	
Connection 1/2 NPT	---	---	on request	no add. cost	no add. cost	
Clamp connection 1" oder 1 1/2"	---	---	---			---
Clamp connection 2"	---	---	---			---
Dairy fitting DIN 11851 DN 25	---	---	---			---
Dairy fitting DIN 11851 DN 40	---	---	---			---
Dairy fitting DIN 11851 DN 50	---	---	---			---
High temperature version +300 °C	---	---	---			---

* Measuring range -1/+x bar

** Wetted parts of clamp or dairy fittings made from stainless steel 1.4435.

Chapter 12

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Test instruments for level sensors

ME 5



For genuine function checks!
Suitable for all GWG level
sensors, also for zone 0!



GPR 4



Sensor test instrument GPR 4

Simple sensor test instrument suitable for use on storage tanks for fuel oils and diesel fuels. Not permitted for use in hazardous areas and not for level sensors, which are installed in tanks containing hazardous media. A signal lamp indicates function or error. Battery-operated. With GWG connector, also suitable for GWG with brass fitting.

Sensor test instrument ME 5

Ex-approved level sensor test instrument with intrinsically safe sensor circuit for genuine function checks of all sensors approved according to TRbF 511, also for sensors which are installed in hazardous areas zone 0. All characteristics of the PTC thermistor are checked via a microprocessor program. Test instructions as well as test results are alphanumerically displayed. Battery operated.

EC design type approval:
TÜV 03 ATEX 2141
Ex II (2) G EEx ia IIB

Level sensor test instruments with plug - suitable for all level sensor fittings.

Sensor test instrument ME 5 P

Level sensor test instrument similar to ME 5 but with product ID.

DG: H	PU	Part no.	Price €
Sensor test instrument ME 5	1	62230	
Sensor test instrument ME 5 P	1	62240	
Carrying case for ME 5	1	62231	
Charger for ME 5	1	62232	
Sensor test instrument GPR 4	1	62301	

Test instruments for tank servicing, pressure gauges for pump test set



Pressure/vacuum instrument S 2510

For measuring pressure, vacuum and differential pressure. For gaseous, dry media which are not corrosive. The series 2500 pressure meters with digital display use state-of-the-art microprocessor technology and are designed for industrial applications.

Measuring range:

-1,000/+1,000 mbar

Accuracy of measurement:

≤ 1 % of measured value

Resolution selectable: 1 mbar or 0.1 mbar in the range from 0 to ±199.9 mbar.

The unit is operated via a smooth, easy-to-clean foil keypad. The measured values are shown on a large LCD display. They can be printed on an optional printer via the integrated infrared interface. Zero correction is carried out automatically as soon as the unit is switched on or manually via a key. The instrument features a „hold“ function, so that a current measured value remains displayed on the LCD. With hoses and adapters especially for testing vacuum and pressure type leak detectors.



Condensate water tester KWT 5

Condensate water tester (conductivity principle) for checking fuel oil and diesel fuel tanks. The probe is lowered to the bottom of the tank. The presence of condensate water is indicated by a lamp. When the probe is raised, the lamp extinguishes as soon as the probe reaches the water/oil interface. This allows the exact level of condensate water to be determined. Battery operated.

The S 2510 pressure and vacuum measuring instrument is designed to quickly and reliably check the switching and alarm points, the pumping capacity and the air tightness of the installation.

Pressure gauges for pump test set



RF 50 PPS

Application

Pressure gauge for checking the pressure and suction capacity of oil burner pumps. Used in conjunction with standard, commercially available pump test valves with G $\frac{1}{8}$ connection.

RF 50 PPS D 101 – without glycerine filling

Housing Ø: 50 mm

Connection: G $\frac{1}{8}$ B bottom without socket

Housing: Plastic

Front glass: Plastic

Accuracy of measurement: Class 1.6

RF 50 PPS D 601 – with glycerine filling

Housing Ø: 50 mm

Connection: G $\frac{1}{8}$ B bottom without socket

Housing: Plastic

Front glass: Plastic

Accuracy of measurement: Class 1.6

	DG	Part no.	Price €
Pressure/vacuum instrument S 2510	H	69876A	
Carrying case for S 2510	H	62300	
Protective case S 2510	H	69341	
Condensate water tester KWT 5	H	44010	
RF 50 PPS D 101 – without glycerine filling -1/0 bar	M	63991	
RF 50 PPS D 101 – without glycerine filling 0/25 bar	M	63995	
RF 50 PPS D 601 – with glycerine filling -1/0 bar	M	67165	
RF 50 PPS D 601 – with glycerine filling 0/25 bar	M	67166	

Test and refill devices for expansion vessels



Test and refill devices PNG-1/PNG-3

For diaphragm expansion vessels in heating and oil supply systems. The test and refill devices PNG-1 and PNG-3 consist of a 60 cm long, flexible filling hose with union nut Vg8 for the test valve at the expansion vessel and a ball valve with 7/16-28 UNEF thread for refill bottle as well as a test pressure gauge Ø 40 mm, class 1.6
PNG-1 0/4 bar
PNG-3 0/10 bar.
The refill bottle is not included.

Refill bottle

Cylinder for increasing the pressure cushion in expansion vessels. With anti-corrosion component, not inflammable. Connection thread 7/16-28 UNEF, suitable for PNG-1, PNG-2 and PNG-3. Contains 400 ml.



Test and refill devices PNG-2

For diaphragm expansion vessels in heating and oil supply systems, specially for systems with test valves which are not easily accessible. During testing and refilling, the fitting is pressed against the test valve.

The test and refill device PNG-2 consists of a rigid, 200 mm long test lance with test head for pressing against the test valve of the expansion vessel and a ball valve with 7/16-28 UNEF thread for refill bottle as well as a test pressure gauge Ø 40 mm, 0/4 bar, class 1.6.

The PNG-2 test and refill device includes a refill bottle and a plastic case.



Test device PGA-4-Set

For expansion tanks, container and tyre pressure. Robust and very accurate pressure gauge in aluminium housing with zero correction. Measuring range 0/4 bar. With three adapters for car valves which are also used for expansion vessels. The three adapters (straight, 45°, 90°) cater for use in even very space restricted areas. Plastic carrying case with insert included.

Test device PGA

Pressure test device PGA from the PGA-4 set, range 0/4 bar, with 45° adapter.

Test device PGWA-Set

For checking pressure in water pipes and expansion vessels. Combination of PGA-4-Set and PGW-10-Set (refer to page 455) plus rigid connection extension and flexible hose with side mounted valve (Vg8) for refilling.

DG: H	Part no.	Price €
Test and refill device PNG-1, 0/4 bar	39616	
Test and refill device PNG-3, 0/10 bar	39637	
Refill bottle, 400 ml	39633	
Test and refill device PNG-2	39634	
Spare case of PNG-2	39635	
Test device PGA-4-Set	39614	
Test device PGA, 0/4 bar	39615	
Test device PGWA-Set	39619	

Pressure test set, pressure test set for water, instrument for volume flow and temperature measurement



Instrument for volume flow and temperature measurement Flowtemp

For checking and adjusting water heaters. The measuring range for the volume flow is selected by an instrument disc with various holes:

- 1.6 to 4 l/min
- 4 to 8 l/min
- 8 to 16 l/min

The instrument is held under an open water tap and indicates the water temperature at a certain flow rate. The unit is supplied in a robust plastic enclosure.



Test set PGW-10-Set

For water pressure in pipes and containers. Robust and very accurate pressure gauge in aluminium housing with zero correction ring. Measuring range 0/10 bar. With adapter for hose tap 1/2" (thread G³/₄), aerator M 24 x 1 (female) and M 22 x 1 (male). Complete with plastic carrying case with insert and a connector for car valves.

Test instrument PGW

Pressure test unit PGW in robust aluminium housing with zero correction ring. Measuring range 0/10 bar, with adapter for car valves. Also suitable for testing water pressures in conjunction with adapters from PGW-10-Set.



Pressure test set AS-2 pressure measuring instrument S 2501

AS-2 consists of the electronic pressure measuring instrument S 2501 (measuring range ± 130 mbar, 0.01 mbar at 0-19.99 mbar, refer to page 461) with plug-in test valve with quick-action coupling, hose fitting with conical test plugs 12-21 mm and 18-34 mm as well as hand ball pump.

Application

Pressure test in pipes, fittings, small containers, primarily however for mains gas pipe testing. Also suitable for checking pressure switches and for carrying out safety tests on pressure monitors as well as other general pressure/vacuum and differential pressure measurements. Data can be accessed via infrared interface.

Options

- EUROPRINTER thermal printer

Please refer to pages 456 to 458 for other leak test instruments.

DG: H	Part no.	Price €
Instrument for volume flow and temperature measurement Flowtemp	69790	
Test set PGW-10-Set	39617	
Test device PGW, 0/10 bar	39618	
Pressure test set AS-2 with pressure measuring instrument S 2501 in plastic case	39593	
Plastic case	39596	
Conical test plugs 12-22 mm	0814020123	
Conical test plugs 19-35 mm	0814020121	
Pressure test set in plastic case without pressure measuring instrument S 2501	39590	
Pressure measuring instrument S 2501	69873	

Leak test instruments

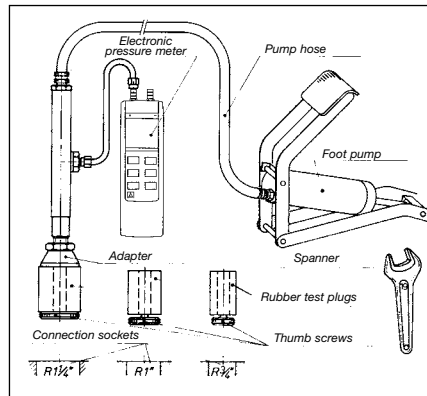
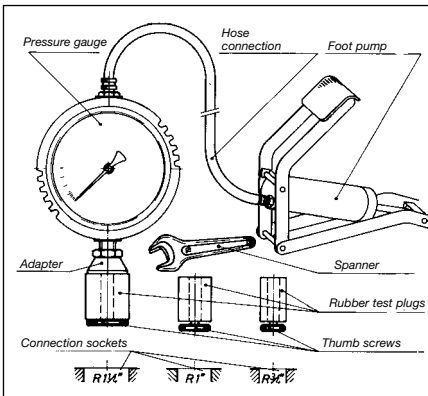
DPK 60



DPK 60-2



Upgrade kit DPK 60-2



Application areas for series DPK 60 leak test sets:

- Leak tests of pipe installations for municipal gas, grid gas and natural gas according to the pressure measurement method with air B 3.
- Leak tests according to the visual inspection method with air A 3.
- Pressure tests of pipes according to DVGW-TRGI (DVGW sheet G 600).

The TRGI regulations of 1986 distinguish between two categories of tests for pipe systems:

- a) Pipes with operating pressures up to 100 mbar.
- b) Pipes with operating pressures of 100 mbar to 1 bar.

Tests according to a) comprise:

1. The **preliminary** test is a load test of newly installed pipes without fittings or with fittings, if the nominal pressure rating of such fittings is at least as high as the test pressure. Pipe openings must be closed with metallic components. Connection to gas carrying pipes is not permitted. Test pressure: 1 bar - 10 min.

The leak test instruments DPK 60 and DPK 60-2 are designed for such tasks.

2. The **main test** is a leak test of all pipes including fittings, but without any gas devices, associated controllers or any safety equipment. Test pressure: 110 mbar - 10 min. The leak test set DPK 60-2 with electronic pressure meter is particularly suitable for these tests as it is capable of detecting small pressure drops of 0.1 mbar within a measuring range of up to 199.9 mbar.

Tests according to b) comprise:

A **combined load and leak test** of the pipes including fittings, the normal pressure ratings of which are at least as high as the test pressure. Test excludes pressure controllers, gas meters, gas instruments and associated control and safety equipment. Pipe openings must be closed off with metallic components. Connection of gas carrying pipes is not permitted. Test pressure: 3 bar at a maximum pressure increase of 2 bar/min.

The DPK 60-2 with pressure meter S 2510 and recorder is particularly suitable for such tests.

- Additionally, the leak test instruments can be used for the following tasks:

1. **Main test or combined load and leak test** of pipes (before gas is admitted), which are out of service or shut down and **pressure tests**, which are used to prove that openings of pipes are correctly sealed (generated pressure is maintained for a short period of time).

2. Leak tests according to the visual inspection method with air: A 3 with foaming agents according to EN 14291:

- Connections and transition points
- Shut-off devices
- Pressure controllers
- Gas meters, other gas devices
- Connection pipes for instruments and fittings
- Seals and test ports. These tests must be carried out at the pressures shown on the type designation labels (nominal pressure ratings) of the respective units. The test pressure should not exceed these nominal pressure ratings.

3. Pressure tests of gas supply pipes and installations on the basis of the visual inspection method with air A 3 and the pressure measurement method with air B 3 according to DVGW sheet G 469 (7/87) and errata sheet (7/87) all in accordance with the regulations stipulated by DVGW sheets G 459, 461/I, 462/I and 472 (9/88).

Leak test sets

DPK 60

Leak test set (refer to page 456 for applications) in robust wooden case, consisting of: Leak test pressure gauge Ø 100 mm with shock protection, measuring range 0 - 1.5 bar with expanded initial graduation (up to 200 mbar), with zero correction. Leak test seal directly mounted on pressure gauge, with three plugs 20, 25, 32 mm. Foot operated pump with non-return valve, capacity per stroke approx. 200 cm³. Connecting hose 2.5 m long. Spanner size 19.

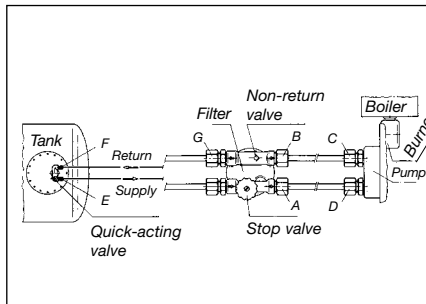
DPK 60-2

Leak test set with electronic pressure meter with measuring range -1,000 mbar to +1,000 mbar and a resolution of 0.1 mbar in the range up to 199.9 mbar. Particularly suitable for leak tests according to DVGW sheet G 600, for preliminary and main tests with operating pressures up to 100 mbar. Refer to page 456 for other applications. Robust wooden case with: Electronic leak test pressure meter S 2510 (refer to page 461). Leak test system with three plugs 20, 25, 32 mm, foot operated pump, two connecting hoses and a spanner.

DPK 60/61

Combination of DPK 60 and DPK 61 in one case.

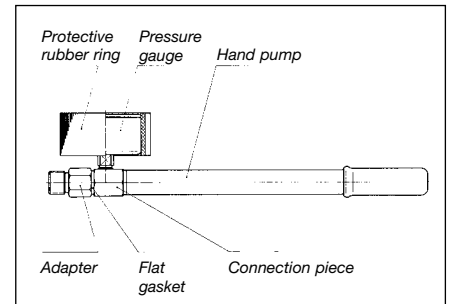
DPK 61



DPK 61

Leak test set for fuel pipes, with wooden case. Case contains: Leak test pressure gauge Ø 100 mm with shock protection, measuring range 0-6 bar. Foot-operated pump with non-return valve. Connecting hose 2.5 m. Spanner size 19. Various adapters.

DPK 54



DPK 54

Leak test set for liquid gas installation pipes. For leak tests with air according to the pressure test method and the visual inspection method. Leak test pressure gauge Ø 63 mm with shock protection, measuring range 0-2 bar with expanded initial graduation (up to 250 mbar). Robust wooden case containing: Leak test pressure gauge, connection piece, hand pump and various adapters.

DG: E	Part no.	Price €
Spare parts:		
Thumb screw 1/2"	37314	
Thumb screw 3/4"	37304	
Thumb screw 1"	37305	
Thumb screw 1 1/4"	37306	
Test plug 1/2"	63020	
Test plug 3/4"	63021	
Test plug 1"	63022	
Test plug 1 1/4"	63023	
Foot-operated pump for DPK 60 and DPK 61	63034	
Pump hose for DPK 60 and DPK 61	63033	
Valve complete for DPK 60 and DPK 61	37315	
Wooden case for DPK 60 and DPK 61	63037	
Hand pump for DPK 54	63038	
Adapter 1/4 LH (female) x 3/8 LH (male)	37301	
Adapter 1/4 LH (female) x 1/2 LH (male)	37302	

DG: H	Part no.	Price €
DPK 60	39600	
DPK 60-2	39603	
DPK 60/61	39612	
DPK 61	39610	
DPK 54	39540	
Spare pressure gauges:		
Pressure gauge for DPK 60	39601	
Upgrade kit DPK 60-2 (S 2510, insert, connection piece)	39608	
Connection piece for DPK 60-2	39604	
Pressure gauge for DPK 61	39611	
Pressure gauge for DPK 54	39541	
Connection piece for DPK 54	37303	

Leak test set with electronic leak rate detection DPK 60-4



Test Report

```
Afriso ---leak-index---
Pruefer:-----
Messstelle:-----08541---
06.07.98
Leckrate LR= 9,201/h
p= 341,0mbar
Textern=23,4°C
Restliche Messzeit: 9:24

Afriso ---leak-index---
Pruefer:-----
Messstelle:-----08541---
06.07.98
Dichtheit dp= 0,1mbar
p= -0,4mbar
Textern=23,6°C
Restliche Messzeit: 0:00
```

Application

The leak test set DPK 60-4 offers the following tests on gas pipes:

1. Test of newly installed pipes with operating pressures up to 100 mbar according to DVGW-TRGI sheet G 600:
 - Preliminary test (load test with 1 bar test pressure)
 - Main test (leak test with 110 mbar test pressure)
2. Leak test of existing pipes with operating pressures up to 100 mbar according to DVGW sheet G 624:
 - Measurement of leak rate (at 110 mbar test pressure)

Description

LEAK INDEX is a digital display leak test instrument with state-of-the-art microprocessor technology with a handy, compact design. The user-friendly system provides a keypad for selecting the operating mode and other functions. The tests are carried out quickly and efficiently. The large, backlit display shows the measured pressure and temperature values. Depending on the operating mode selected, the battery level „Pressure measurement“, pressure loss „Leak test“ and the leak rate „Leak rate measurement“ are also displayed.

An audible signal indicates the end of the test. Test reports (with date and time) can be created via an optional thermal printer with infra-red interface at the end of the test.

In addition, **LEAK INDEX** is suitable for measuring pressure and differential pressures up to 1,500 mbar.

Scope of delivery

- Leak test instrument **LEAK INDEX** with battery charger and leak rate sensor
- Handy and robust case with a comprehensive set of accessories
- Robust manual pump, firmly installed in the case
- External temperature sensor
- Set of test plugs
- Highly flexible connection hose with precision bleed valve and quick-action couplings
- 1 bottle of leak detection spray
- Test pressure gauge 1.6 bar

Technical specifications

Pressure

Measuring range: 0/1,500 mbar
Resolution: 1 mbar
Accuracy of measurement: 3 % of measured value (at 20 °C)

Leak rate

Measurement pressure: 10/150 mbar
Measuring range: 0/1 l/h
Resolution: 0.1 l/h
Accuracy of measurement: 5 % of measured value

Max. pipe volume

100 l

Temperature

Measuring range: -20/+100 °C

Resolution: 0.1 °C

Accuracy of measurement: ±1 °C

General specifications

Supply voltage: DC 6 V

Service time: Up to 60 hours

Display (backlit): 4 lines with 16 characters each

Operating temp.: -10/+50 °C

Storage temp.: -20/+60 °C

Real-time clock with date

Serial interface

Auto-zero correction when switched on. Precision bleed valve for easy setting of test pressure

Options

- EUROPRINTER thermal printer
- Single pipe union connector, adapters with stop valves

DG: H	Part no.	Price €
DPK 60-4	39605	
Single pipe union connector DN32	08 14 020113	
Connecting hose with 2 quick-action couplings	39709	
EUROPRINTER thermal printer	69480	

Please enquire about additional accessories and spare parts.

Gas detectors GSP1 and GSP3



Gas detector GSP1 with indication of concentration

Gas detector GSP3

Gas leaks may cause explosions. The gas detectors are designed to detect even the smallest leaks in gas pipe systems. They enable rapid and easy detection of gas leaks even in areas which are difficult to access.

Gas detector GSP1

Portable gas detector with indication of concentration for detecting gas leaks in gas pipes as well as connection pieces and fittings, gas meters, gas burners and gas tanks (inflammable gases). The unit can be used as a leak detector or as a gas concentration meter in rooms. In order to enable leak detection in spaces difficult to access, the unit features a flexible gas detection probe with a semiconductor element. The high-sensitivity sensor is suitable for the detection of a wide range of different inflammable gases such as methane, propane and butane (basic calibration for methane). Concentrations up to 2,000 ppm are indicated by the luminous band. When the gas concentration reaches 1 % by volume, the unit activates an audible alarm. The instrument switches off automatically if no button is pressed for more than 5 minutes and if no concentration of more than 80 ppm was measured during this period.

Technical specifications

Sensor principle: Semiconductor
Range: 0 to 2,000 ppm (methane)
Sensitivity: 20 to 50 ppm (methane)
Visual indication: Diode chain
 20 x ± 3 LEDs
Audible alarm: Piezo buzzer
Supply voltage: NiMH battery
 5 V/1,6 Ah, external power supply unit
Service time: Approx. 24 hours
Automatic shut-off: after 5 minutes
Operating temperature: 0 °C/40 °C
Storage temperature: -5 °C/+40 °C
 20/80 % r. h.

Dimensions:
 W x H x D: 72 x 130 x 26 mm
Flexible arm: 295 mm incl. sensor
Weight: 360 g

Gas detector GSP3

Portable gas detector for detecting gas leaks in gas pipes as well as connection pieces and fittings, gas meters, gas burners and gas tanks (inflammable gases). The gas sensor responds to all inflammable gases such as methane, propane, butane. To detect a leak, the sensor is moved over the suspected leak position. The intensity of the escaping gas is indicated by two red LEDs. At the same time the instrument generates an audible signal, whose frequency is proportional to the gas concentration.

Technical specifications

Sensor principle: Semiconductor
Range: 0/2,000 ppm (methane)
Sensitivity: 50 ppm
Visual indication: 3 LEDs
Audible alarm: Piezo buzzer
Supply voltage: 2 x 1.5 V alkaline battery (Mignon, AA)
Service time: Approx. 10 hours
Automatic shut-off: after 4 minutes
Operating temperature: 0 °C/40 °C
Storage temperature: -5 °C/+40 °C
 20/80 % r. h.

Dimensions:
 W x H x D: 124 x 60 x 30 mm
 incl. sensor
Weight: 160 g

DG: H	Part no.	Price €
Gas detector GSP1 with rechargeable battery and charger	61191	
Protective pocket for GSP1	61196	
Protective case for GSP1	69425	
Gas detector GSP3	61194	

Handheld electronic pressure instruments

Series 2400 (FZM/DMG)



With protective housing (option)



Connection fittings for FZM



Connection fittings for DMG



Application

For measuring pressure, vacuum and differential pressure.
For gaseous, non-corrosive dry media.

Description

The series 2400 pressure instruments are based on a microprocessor controlled evaluation and display system. A 4-digit LCD display indicates the measured values. The instruments are supplied by 9 V batteries. The electronic sensor system is built into a robust, handy housing. When the unit is switched on, all available segments of the display are shown for 2 seconds. After this segment test, the unit switches immediately to measuring mode. Automatic zero setting. Accessories include a protective housing (with magnetic holder, stand, transparent slide). These housings can be interconnected thus allowing for a combination of several units in one easy-to-manage assembly.

Technical specifications

Supply voltage
Alkaline battery 9 V (included)
Service life approx. 200 hours

Display

13 mm high 4-digit LCD

Pressure unit

mbar

Hose connections

2 x for 3 mm hose with
1 mm wall thickness

Operating temperature range

Medium: 0 °C/+50 °C
Ambient: 0 °C/+50 °C
Storage: -20 °C/+50 °C

Housing

Plastic, blue
W x H x D: 70 x 125 x 31 mm

Measuring range/accuracy of measurement

(selectable MR I / MR II, accuracy of MV = of measured value)

Type FZM 20

MR I: 0/±19.99 mbar
±1 % of MV (±1 digit)
Resolution 0.01 mbar

MR II: 0/±150.0 mbar
±1 % of MV (±1 digit)
Resolution 0.1 mbar

Max. static pressure 1.3 bar

Type DMG 02

MR I: 0/±199.9 mbar
±1% of MV (±1 digit)
Resolution 0.1 mbar

MR II: 0/±500 mbar
±1 % (±1 digit)
Resolution 1 mbar

Max. static pressure 1.3 bar

Type DMG 12

MR I: 0/±199.9 mbar
±1 % of MV (±1 digit)
Resolution 0.1 mbar

MR II: 0/±1,000 mbar
±1 % of MV (±1 digit)
Resolution 1 mbar

Max. static pressure 3 bar

Type DMG 22

MR I: 0/±199.9 mbar
±1 % of MV (±1 digit)
Resolution 0.1 mbar

MR II: -1,000/+1,999 mbar
±1 % of MV (±1 digit)
Resolution 1 mbar

Max. static pressure 4 bar

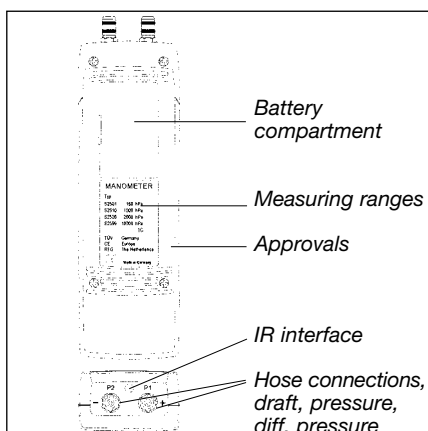
Scope of delivery

- Alkaline battery 9 V
- FZM with connection fittings part no. 18 06 00 05
- DMG with connection fittings part no. 18 05 00 05

DG: H	Part no.	Price €
FZM 20	69655	
DMG 02	69656	
DMG 12	69657	
DMG 22	69658	
Accessories/ spare parts		
Protective housing with magnet	69425	
Protective pocket	69848	
Connection fittings for FZM	18 06 00 05	
Connection fittings for DMG	18 05 00 05	
Hose adapter (8 mm)	18 06 000501	
Silicone hose	68660	

Handheld electronic pressure instruments

Series 2500 (microprocessor-controlled)



EUROPRINTER thermal printer



Application

For measuring pressure, vacuum and differential pressure. For gaseous, non-corrosive dry media.

Description

The series 2500 pressure meters with digital display use state-of-the-art microprocessor technology and are designed for industrial applications.

The unit is operated via a smooth, easy-to-clean foil keypad. The measured values are shown on a large LCD display. They can be printed on an optional thermal printer via the integrated infrared interface. Zero correction is initiated automatically as soon as the unit is switched on, or manually via a key. The instrument features a hold function so that a current measured value remains displayed on the LCD.

Technical specifications

Supply voltage

2 Alkaline batteries 1.5 V (included), battery life approx. 300 hours (continuous operation)

Display

13 mm high LC display

Pressure units

bar, mbar, hPa (selectable)

Hose connections

2 x Ø 8 mm plug connection (S 2501 and S 2510)

2 x Ø 3 mm plug connection (S 2520 and S 2599)

Operating temperature range

Medium: 0 °C/+40 °C

Ambient: 0 °C/+40 °C

Storage/transport: -20 °C/+50 °C

Temperature coefficient

0.05 %/K

≤ 0.03 %/K of FSO for version S 2501TC

Housing

Plastic, blue

W x H x D: 60 x 190 x 36 mm

Measuring ranges/accuracy of measurement

Accuracy of measurement

≤ 1.0 % of measured value

≤ 0.6 % of measured value for S 2501TC

Type S 2501 – 0/±130 mbar

0/19.99 mbar:

Resolution 0.01 mbar

≥ 20 mbar:

Resolution 0.1 mbar

Max. static pressure 1 bar

Type S 2510 – 0/±1,000 mbar

0/199.9 mbar:

Resolution 0.1 mbar

200/1,000 mbar:

Resolution 1 mbar

Max. static pressure 2 bar

Type S 2520 – -1,000/+2,000 mbar

0/199.9 mbar:

Resolution 0.1 mbar

200/2,000 mbar:

Resolution 1 mbar

Max. static pressure 4 bar

Type S 2599 – -1/+7 bar

0/1.999.9 mbar:

Resolution: 0.1 mbar (to 199.9 mbar)
1.0 mbar (≥ 200 mbar)

2.0/7.0 bar:

Resolution: 0.01 bar

Max. static pressure 10 bar

Scope of delivery

Includes 2 alkaline batteries 1.5 V

Options

- Type S 2501 with temperature compensation and calibration certificate (= type S 2501 TC, accuracy of measurement ≤ 0.6 %)

DG: H	Part no.	Price €
S 2501	69873	
S 2501TC	69690	
S 2510	69876	
S 2520	69877	
S 2599	69884	
Accessories:		
Protective housing with magnet	69341	
Connection fittings	69840	
EUROPRINTER thermal printer	69480	

Handheld electronic thermometers

TM6 and TM8-IR



TM6

Description

Very handy, robust temperature measuring instrument for simple, accurate and extremely fast measurements of surfaces, liquids, soft-, plastic media or in air and gases. The unit features max, min and „hold“ function, an RS232 interface as well as a memory for 16 measured values. In addition, the displayed measured value can be corrected, e.g. in order to compensate for sensor tolerances (1 point-cal-function).

Refer to page 463 for sensors TM5/TMD5.

Technical specifications

Thermocouple

Type K (NiCr-Ni)

Measuring range

-99.9 °C/+1,370 °C

Accuracy of measurement

±0.5 °C
(±1 digit) (instrument only)

Resolution

0.1 °C from -99.9 °C/+299.9 °C, otherwise 1 °C

Memory capacity

20 measured values

Plug connection

Miniature connector

Operating temperature range

Ambient: 0 °C/+50 °C

Display

1 line LC display



TM8-IR

Housing
Impact resistant plastic (ABS)

Dimensions

W x H x D: 65 x 130 x 25 mm

Weight

240 g

Supply voltage

2 x 1.5 V AA, batteries

Battery life

Approx. 200 hours

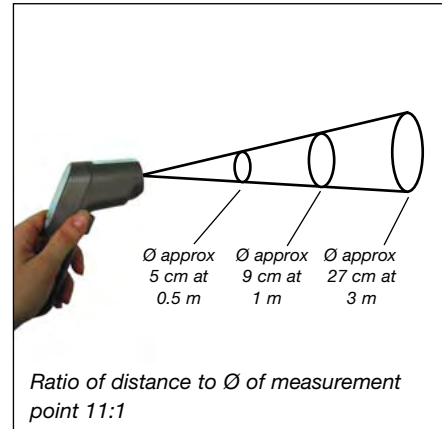
TM8-IR

Description

The TM8-IR temperature measuring instrument is a non-contact infrared thermometer with laser aim and large, backlit LCD display. Infrared thermometers are particularly suitable for measuring surface temperatures. The special benefit is the short response time (less than a second) without having to come in contact with the measured object. Therefore, the instrument is particularly suitable for moving (e.g. paper reels, tyres) or live (e.g. electrical assemblies, transformers) parts. Also for measurements in the food industry, because the medium is not polluted by a sensor. An additional NiCr-Ni thermocouple can be connected to the instrument.

The ratio of distance to measurement point is 11:1.

The measured object must always be larger than the diameter of the measurement point.



Technical specifications

Measuring range infrared

-33 °C/+500 °C

Measuring range thermocouple

-64 °C/+1,400 °C

Accuracy of measurement infrared

±2 °C or ±2 % of measured value
(the greater value applies)

Spectral sensitivity

6/14 µm

Accuracy of measurement thermocouple

±1 °C or ±1 % of measured value
(the greater value applies)

Operating temperature range

Ambient: 0/+50 °C

Storage/transport: -10/+50 °C

Response time

1 second

Ratio distance to Ø measurement point

11:1

Adjustable degree of emission

0.10 ~ 1.00 increments of 0.01

Battery life

Approx. 140 hours of continuous operation

Dimensions

W x H x D: 39 x 175 x 80 mm

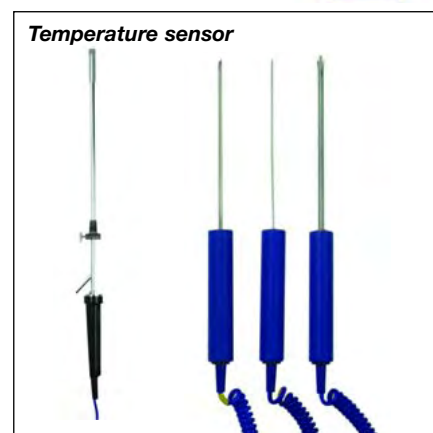
Weight

180 g (with batteries)

DG: H	Part no.	Price €
TM6	70038	
TM8-IR	70039	

Handheld electronic thermometers

TM5 and TMD5



Application

For simple, accurate and extremely fast measurements of surfaces (e.g. supply and return pipes), liquids, soft plastic media, air/gases and extremely small objects as well as thermal throughput values and insulation values.

Description

TM5 and TMD5 electronic thermometers consist of an electronic measuring system type K (NiCr-Ni) and a microprocessor-controlled evaluation and display system. A 4-digit LCD display shows the measured values. The instruments are supplied by 9 V batteries. When the unit is switched on, all available segments of the display are shown for 2 seconds. After this segment test, the unit is ready for operation. The instruments feature a measurement unit selection facility (Celsius or Fahrenheit). With the TMD5, it is sufficient to press a key to switch between the measured values T_1 , T_2 and T_1-T_2 (differential temperature). Accessories include a protective housing (with magnetic holder, stand, transparent slide) and a protective pocket.

Technical specifications

Sensor connection TM5

2-pole standard connector suitable for all NiCr-Ni sensors (type K).

Sensor connection TMD5

Two 2-pole standard connectors T_1 , T_2 and T_1-T_2 =differential temperature. Selectable via keypad.

Sensor principle

Thermocouple NiCr-Ni (type K)

Measuring range

-50 °C/+1,100 °C

Measured values

Minimum, maximum, current value

Accuracy of measurement

-50.0/0.0 °C ± 0.6 % of MV ± 0.5 °C
 0.1/1,100 °C ± 0.5 % of MV ± 0.3 °C

Resolution

0.1 °C (from -50 °C/+99.9 °C)
 1 °C (from 100 °C/1,100 °C)

Display

LCD 4 digits, 13 mm

Operating temperature range

Ambient: 0 °C/+50 °C
 Storage/transport: -10 °C/+50 °C

Supply voltage

Battery 9 V (included)
 Approx. 150 hours (zinc carbon battery)
 Approx. 270 hours (alkaline battery, not included)

Housing

Plastic, blue

W x H x D: 70 x 125 x 34 mm

Weight

Approx. 200 g with battery

Features:

- Extremely fast measurements
- High resolution
- High accuracy
- Universal application

DG: H	Part no.	Price €
TM5	70046	
TMD5	70047	
Accessories		
Air, gas, liquid sensor up to 900 °C	69867	
Surface sensor up to 450 °C	69866	
Spike sensor up to 600 °C	69868	
HT sensor 1,200 °C L = 700 mm	69853	
HT sensor 1,200 °C L = 1,000 mm	69854	
Protective pocket TM5/TMD5	69848	
Please enquire about other sensors, e.g. gripper sensor for pipes.		

Air speed measuring instrument

LGM 1



Vane probe 70



Vane probe 25

Resolution: 0.01 m/s or 1 ft/min
Display: 13 mm LCD display
Permissible operating temp.:
 Instrument: 0/+50 °C
 Measuring probes -30 °C/+100 °C

LGM 1 – complete

This digital display air speed measuring instrument with microprocessor is designed for connection to vane probes. LCD with automatic battery check. The units can be switched from 0.01 m/s to 1 ft/min. The measuring period can be set for either 2 or 16 seconds. The current and mean values can be displayed for both measuring periods. The minimum and maximum values are stored.

The unit is available with 2 different vane probes:

Ø 70 mm – 0.20 to 40 m/s,
 Ø 25 mm – 0.30 to 35 m/s.

Supply voltage:
 Battery 9 V IEC
 6 LR 61
Battery life: Approx. 40 hours
Battery check: Automatic
Dimensions (W x H x D):
 Instrument: 60 x 125 x 36 mm
 Probe 70: Ø 70 mm
 Probe 25: Ø 25 mm

Scope of delivery:
 Instrument, vane probe 25 or 70
 (please specify required vane probe when ordering), extension rod, connection cable and case.



Technical specifications

Measuring ranges:

Probe 70: 0.20/40.00 m/s
 (35/7,300 ft/min)

Probe 25: 0.30/35.00 m/s
 (55/6,400 ft/min)

Accuracy of measurement:

Probe 70: ±0.5 % of measured value
 Probe 25: ±1.0 % of measured value
 ±1 digit

DG: H	Part no.	Price €
Air speed measuring instrument LGM 1 (with one vane probe)	69900	
Spare parts and individual parts		
Vane probe 25	69905	
Vane probe 70	69906	
Kit of accessories	69907	

Volume flow measuring instruments

VMG 01

new



Dynamic pressure probe



Features:

- Integrated memory
- Serial interface for data transfer to PC
- Easy-to-follow menu guide system
- PC software for further data processing included
- Selection of measurement units via menu

Application

Portable digital display instrument for simultaneous measurement of speed, temperature, volume flow, differential pressure and absolute pressure in flue gas ducts and pipes.

Description

The gas is measured with the dynamic pressure probe in the flue gas volume flow. The differential pressure is measured continuously. The differential pressure at the dynamic pressure probe indicates the speed of the flue gas. The volume flow in the flue gas can be determined with reference to the cross section of the flue gas duct. The volume flow measuring instrument is particularly suitable for measuring tasks requiring high precision and online documentation. The application areas include measurements as a reference instrument for checking production processes, comparison measurements for service and maintenance as well as long term monitoring. The instrument features a comprehensive memory for recording measured values for subsequent evaluation with a PC.

Technical specifications

Measuring principle

Measurement of dynamic pressure

Measuring range

Differential pressure 0/10 mbar

Operating temperature range

Medium: Max. 600 °C

Ambient: 0 °C/+20 °C

Permissible gas speed

> approx. 4 m/s

Dew point difference

Min. +5 K

Display

Graphic backlit display with high resolution (128 x 64 pixels)

Menu system

Via 6 navigation keys

Probe

Dynamic pressure probe with integrated temperature sensor

Probe length

300 mm

Supply voltage

Battery 12 V/0.5 A

Battery life

Approx. 18 hours without display backlight, approx. 5 hours with backlit display on.

Memory

58 measurements with 50 measured values each

Interface

Serial interface for data transfer to PC

Scope of delivery

- Instrument
- Dynamic pressure probe
- Power supply unit/battery charger
- Plastic case
- PC software

Options

- Probe lengths 400-2,000 mm

DG: E	Part no.	Price €
VMG 01 with probe 300 mm	68975	

Humidity and air temperature measuring instruments

Series FT3 to FT6



Application

FT3 to FT6 are used by estate agents, facility management companies, surveyors, architects, construction companies, manufacturers of prefabricated houses, manufacturers of caravans and mobile homes, etc. to quickly check the substance of buildings or climatic room conditions.

Description

Digital display humidity and temperature measuring instruments with electronic sensor system.

The units are supplied by 9 V batteries (type E block 6 F 22 or IEC 6 LR 61). Various permanently connected sensor versions are available, depending on application requirements.

FT3 - sensor integrated in instrument housing

FT4 - sensor with flexible spiral cable

FT5 - sensor fitted to 30 cm long flexible probe

FT6 - sensor integrated in instrument housing

The FT3 to FT5 instruments measure temperature and relative humidity. FT6 measures temperature and absolute humidity in g/kg. The 4-digit LCD display with automatic battery check displays the measured value in digital form. The foil keypad allows the user to select various functions. Key ON/OFF for switching the instrument on and off. Selector key °C/°F. Selector key for measured value T = temperature, Td = dew point, rH = relative humidity (%) or - for FT6 - absH = absolute humidity (g/kg).

The selected measured value is indicated by an arrow symbol. Key HOLD = selector key for „measure“ or „hold“. Key MIN MAX = selector key for minimum, maximum or current measured value.

Technical specifications FT3 – FT5

Dimensions (without sensor)

W x H x D: 70 x 125 x 34 mm

Weight (with battery)

Approx. 210 to 250 g (depending on version)

Storage and transport temperature

-10 °C/50 °C

Battery life

Approx. 150 hours (zinc carbon battery) or approx. 270 hours (alkaline battery)

Sensor principle

Multiparameter SingleChipSensor

Humidity

Measuring range

0 % rF/100 % rF

Accuracy of measurement (10-90 % rF)

±2 % rF ±1 digit, otherwise max. ±4 % rF

Resolution

0.1 % rF

Repeatability

±0.2 % rF

Response time (T63)

≤ 5 seconds in slightly moving air

Temperature measuring range

-40 °C/80 °C

Accuracy of measurement (0-40 °C)

±0.5 °C ±1 digit, otherwise max. ±1.5 °C

Dew point (calculated)

Measuring range

-40 °C/120 °C

Resolution

0.1 °C

Technical specifications FT6

Humidity

According to EN-Norm 267 (for NOx emissions)

Temperature

Measuring range

-40 °C/80 °C

Accuracy of measurement (0-40 °C)

±0.5 °C ±1 digit, otherwise max. ±1.5 °C

DG: H	Part no.	Price €
FT3	70043	
FT4	70044	
FT5	70048	
FT6	70049	
Accessories:		
Protective housing with magnet	69425	
Protective pocket for FT3, FT4, FT6	69848	
Protective pocket for FT5	61196	

Flue gas analysis computer EUROLYZER



EUROLYZER

EUROLYZER is a handheld digital display flue gas analyser with state-of-the-art processor technology and convincing, user-friendly design. This instrument is the ideal solution for checking and servicing small heating systems (e.g. gas burners) according to the German BImSchV guidelines. In addition, EUROLYZER can be used for CO concentration safety checks in gas-fired systems. The bright, easy-to-read display shows a freely selectable combination of two measured values, thus allowing for easy optimum burner adjustment.

Measured parameters:

O₂, CO, flue gas temperature, ambient temperature, optionally draft.

Calculated parameters:

CO₂, CO absolute, lambda, efficiency η or flue gas losses q_A.

The simple and logically structured keypad allows for easy operation. As soon as the unit is switched on, it performs an automatic segment test and a 60 second calibration. Self-monitoring system with blinking error alarm and battery status indication. The fuel is selected via the arrow keys on the keypad: fuel oil EL, heating oil M, heating



oil S, natural gas methane, liquid gas propane or butane. The user only has to confirm the fuel selection in order to start the measuring program.

State-of-the-art sensor technology with compact sensors which are protected by selective filters ensures a prolonged service life.

The arrow keys allow you to scroll through the available fuels.

(up: O₂, CO₂, q_A, T_A, draft; down: CO, CO_{abs}, λ , T_{GAS}).

The integrated infrared interface allows you to print the measured data and to create a record directly on site.

With separate programme for (differential) temperature and pressure measurement (only for part no. 69349).

EUROLYZER

Scope of delivery: EUROLYZER

with or without draft for O₂, CO, T_A, T_{GAS}, CO₂, λ , q_A, with batteries, calibration certificate, power supply unit, flue gas probe immersion depth 300 mm, ambient air sensor, connection kit for gas fittings (only for EUROLYZER with draft), protective housing with magnet, aluminium case.

Please enquire about maintenance contracts.

Technical specifications

Flue gas temperature:

Measuring range: 0 °C/+1,000 °C

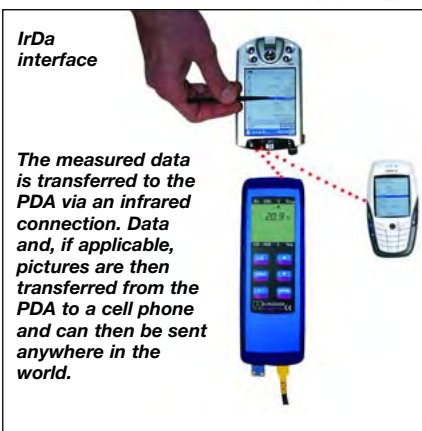
Resolution: 1 °C

Thermocouple: NiCr-Ni 1/2 DIN

Outside wall/air temperature:

Measuring range: -20 °C/+200 °C

Resolution: 0.5 °C



O₂ measurement:

Measuring range: 0/21 % by volume

Max. deviation: ± 0.2 % by volume

Resolution: 0.1 % by volume

CO₂ determination:

Measuring range: 0/CO₂ max.

Resolution: 0.1 % by volume

CO measurement:

Measuring range: 0/4,000 ppm

Resolution: 1 ppm

Draft/pressure measurement (optional):

Measuring range: ± 50 mbar

Resolution: 0.01 hPa

Power supply:

2 x Mignon batteries or power supply unit

Display: LCD transfective

Housing: Mineral fibre plastic

Colour: RAL 5015 (blue)

Protective housing: Soft plastic

Keypad: Foil keypad

Connections: $\varnothing$ 7 mm (draft/pressure)

$\varnothing$ 8 mm (Gas)

Therm. connections:

Ω -thermosockets

Interface: Infrared: HP protocol

Printer: Thermal printer

Dimensions W x H x D:

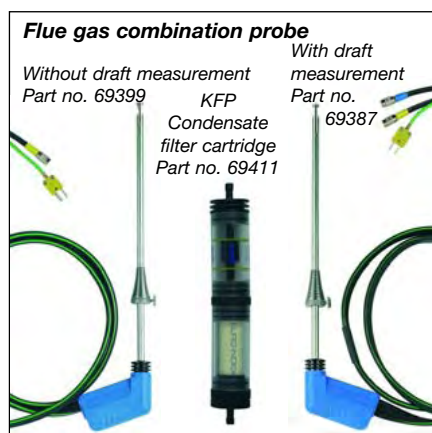
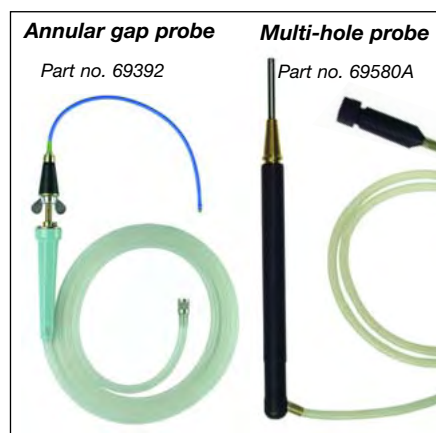
60 x 190 x 36 mm

Weight: Approx. 400 g

TÜV By RgG 190/TÜV CO test

DG: H	Part no.	Price €
EUROLYZER without draft, in case	69348A	
EUROLYZER with draft, in case	69349A	
IrDA-interface		on request

Accessories and spare parts for EUROLYZER



DG: H	Part no.	Price €
EUROLYZER without draft (instrument only, no accessories)	24 12 04	
EUROLYZER with draft (instrument only, no accessories)	24 12 06	
Power supply unit	69995	
Protective housing with magnet	69341	
Magnets for protective housing	69849	
Aluminium case	69032	
EUROPRINTER thermal printer	69480	
Printer paper for EUROPRINTER (5 rolls)	69481	
Printer paper for EUROPRINTER , self-adhesive (1 roll)	69033	
Printer paper for HP printer (5 rolls)	69421	
Flue gas combination probe TÜV 99 without draft connection and KFP condensate filter cartridge	69399	
Flue gas combination probe TÜV 99 with draft connection, without KFP condensate filter cartridge	69387	
Flue gas combination probe TÜV 99 exclusive with removable plug-in pipe and draft connection, without KFP condensate filter cartridge	69437	
Probe pipe for flue gas combination probe part no. 69437, Ø 8 mm, 300 mm long	695 000 0093	
Thermocouple with compensating cable and plug	550 000 0019	
Condensate filter cartridge KFP complete (refer to page 474 for parts)	69411	
Infiltec fine filter (5 pieces)	69412	
Teflon membrane (10 pieces)	69206	
Ambient air sensor (stub sensor blue)	69403	
Air sensor with magnetic holder (2.5 m long)	69404	
Outside wall temperature sensor	69428	
Multi-hole probe with connection fitting	69580A	
Multi-hole probe, plug-in for flue gas combination probe TÜV 99, part no. 69437	69422	
Annular gap probe for measurement of CO and O ₂ concentrations in the annular gap of double-wall chimneys of gas furnaces	69392	
Soot pump with soot comparison scale and filter paper (refer to page 470)	69581	
Filter paper (200 pieces)	68400	
Soot scale	68300	
Please contact our service centre for maintenance costs and quick service. Phone +49-7135/102-127		
Please enquire about maintenance contracts.		

Flue gas analysis computer MULTILYZER



MULTILYZER

MULTILYZER is a digital display flue gas analysis computer with state-of-the-art processor technology and convincing, compact design.

Measured parameters: O_2 , CO_{H_2} , flue gas temperature, combustion air temperature, draft, pressure, differential pressure.

Options: $CO_{20,000}$, NO , SO_2

Calculated parameters: CO absolute, CO_2 , NO_x , lambda, eta efficiency, flue gas losses, dew point, temperature difference.

Options: Solid fuel calorific value EB, 15 minutes mean value for solid fuel measurement, eta efficiency condensing systems.

Input possibilities for soot spot number, oil derivatives, boiler temperature and customer number. The unit features a memory for 100 blocks of measurements. This instrument is the ideal solution for checking and servicing small and medium sized heating systems according to the German BImSchV guidelines. In addition, MULTILYZER can be used for CO concentration safety checks in gas-fired systems. A second flushing pump protects the CO measuring cell even at high CO concentrations.



MULTILYZER is also designed for measurements on all condensing systems as well as wood burning systems, in particular for optimum burner adjustment of wood pellet heating systems.

The electronic core search function allows for optimum burner adjustment which is further facilitated by continuous and simultaneous indication of four measurement parameters. The zoom function lets you read the O_2 , CO and temperature values even from a distance (large boilers installations). The graphic display of measured values facilitates optimum burner adjustment. The measured values can be printed directly from the unit's memory (100 measurement blocks) or transferred to a PC for further processing.

Scope of delivery:

MULTILYZER up to 4 measuring cells and T_{A_1} , T_{Gas} , CO_2 , λ , q_a , with calibration certificate, power supply unit, flue gas probe immersion depth 300 mm, condensate filter cartridge, ambient air sensor, connection kit for gas fittings, protective housing with magnet, aluminium case.

EUROPRINTER thermal printer



Options:

IrDA interface, aluminium case, thermal printer.

MULTILYZER can be equipped with an optional IrDA interface for wireless, bi-directional data transmission. IrOBEX protocol for pocket PCs (PDA, Palm, iPAQ) and all notebooks supporting IrDa. For example, the measured values are transferred from the measuring instrument to a PDA via the infrared connection. This information is then transmitted along with pictures of the heating system to a cell phone and can then be sent anywhere in the world. This optimises all processes involved in customer service: documentation, qualified support of service technicians who are on site, etc.

TÜV By RgG 183

Please refer to page 470 for technical specifications.

DG: H	Part no.	Price €
MULTILYZER O_2, CO_{H_2}, differential pressure	69415A	
MULTILYZER O_2, CO_{H_2}, $CO_{20,000}$, solid fuel prog., differ. press.	69418A	
MULTILYZER O_2, CO_{H_2}, $CO_{20,000}$, differential pressure	69601A	
MULTILYZER O_2, CO_{H_2}, NO, differential pressure	69416A	
MULTILYZER O_2, CO_{H_2}, $CO_{20,000}$, NO, differential pressure	69603A	
MULTILYZER special equipment	69606S	on request
Infrared interface IrDA for data transmission	69534	on request
Please enquire about maintenance contracts.		

Accessories and spare parts for MULTILYZER and MULTILYZER NG



Technical specifications

Flue gas temperature:

Measuring range: 0 °C/+1,000 °C

Resolution: 1 °C

Combustion air temperature:

Measuring range: -20 °C/+100 °C

Resolution: 0.1 °C

Pressure measurement:

Measuring range: ±150 hPa (mbar)

Resolution: 0.01 hPa

O₂ measurement:

Measuring range: 0/20.9 % by vol.

Resolution: 0.1 % by vol.

CO₂ determination:

Measuring range: 0/CO₂ max.

Resolution: 0.1 % by vol.

CO measurement (without H₂):

Measuring range: 0/2.0 % by vol.

Resolution: 0.01 % by vol.

CO measurement solid fuels:

Measuring range: 0/20,000 ppm

Resolution: 5 ppm

NO measurement:

Measuring range: 0/2,000 ppm

Resolution: 1 ppm

SO₂ measurement:

Measuring range: 0/2,000 ppm

Resolution: 1 ppm

Flue gas loss QA:

Range: 0/100 %

Efficiency eta:

Range: 100 %/0 %

Lambda:

Range: 1/99,999

Dew point:

Range: 0/100 °C

Efficiency calorific value - etaCV:

Range: 110 %/0 %

Power supply:

NiMH battery 6V/2 Ah, ext. power supply unit

Display: Alphanumeric, backlit 6.5 x 4.5 cm

Memory: 100 measurement blocks min.

Interface: Infrared and RS 232

Printer: Thermal printer

Permissible operating temp.:

+5 °C/+40 °C

Storage temperature: -5 °C/+50 °C

Dimensions (W x H x D): 95x215x45 mm

Weight MULTILYZER set: Ap. 2,500 g

DG: H	Part no.	Price €
MULTILYZER (instrument only, no accessories)		
MULTILYZER without NO, with differential pressure	69352	
MULTILYZER with NO, with differential pressure	69353	
Battery charger	69406	
Protective housing with magnet	69350	
Protective pocket with magnet	69424	
Aluminium case	69032	
EUROPRINTER thermal printer	69480	
Printer paper for EUROPRINTER (5 rolls)	69481	
Printer paper for EUROPRINTER, self-adhesive (1 roll)	69033	
Printer paper for HP printer (5 rolls)	69421	
Software Eurosoft	69391	
Interface cable	69410	
Flue gas combination probe length 170 mm, without KFP	69482	
Flue gas combination probe TÜV 99	69468	
with removable plug-in pipe		
with differential pressure connection, without KFP condensate filter cartridge	69437	
Flue gas probe plug-in pipe Ø 8 mm, 300 mm long	695 000 0093	
Thermocouple with compensating cable and plug	550 000 0043	
Condensate filter cartridge KFP complete (refer to page 474 for parts)	69411	
Gas treatment system MGA-1 , e.g. for condensing systems	69207	
Infiltec fine filter (5 pieces)	69412	
Teflon membrane (10 pieces)	69206	
Ambient air sensor (stub sensor blue)	69403	
Air sensor with magnetic holder (2.5 m long)	69404	
Outside wall temperature sensor	69428	
Multi-hole probe , plug-in, instead of plug-in pipe	69422	
Annular gap probe for measurement of CO and O ₂ concentrations in the annular gap, refer to page 468	69392	
Differential pressure connection set	69839	
Soot pump with soot comparison scale and filter paper	69581	
Filter paper (200 pieces)	68400	
Soot scale	68300	
Please enquire about maintenance contracts.		

Flue gas analysis computer MULTILYZER NG



Features:

- USB interface for PC/notebook and infrared interface for printer
- Measuring configuration can be programmed as required
- Measuring mode with two active levels (multitasking mode)
- LCD display with up to 10 measured values at a glance

MULTILYZER NG

MULTILYZER NG is the ideal solution for checking and servicing small and medium sized heating systems according to the German BImSchV guidelines. MULTILYZER NG can be used for CO concentration safety checks on gas fired systems. In addition, the instrument can be used for measurements and adjustments of solid fuel systems, in particular for pellets, as well as bi-valent, modulating combined heating and power plants.

The compact design allows the instrument to be equipped with any combination of up to six electrochemical cells.

In addition to the existing approvals according to BImSchV and KÜO, MULTILYZER is also approved according to the stringent rules of EN 50379 (part 2) and is therefore also suitable for measurements regulated by law in Europe. The large LCD display allows you to display either 5 or 10 measured values. The measured values can be printed either directly from the measuring programme or from the memory via an infrared printer. In addition, the instrument features a USB connection for data transmission to a PC. MULTILYZER NG is also equipped with a device monitoring function, limit value monitoring (flushing pump, can also be operated manually), graphic evaluation of the measured values with combustion charts for small gas and fuel oil systems as well as a core search function. 4 measured gas values can be displayed and the pressure measurement value in six different units. Various measuring programmes for (differential) pressure and temperature with min./max. indication of all measured values with re-set function are available.

Calculated parameters: CO absolute, lambda, CO₂, eta efficiency, flue gas losses, dew point, temperature difference.

Scope of delivery: MULTILYZER NG up to 6 measuring cells and T_A, T_{Gas}, CO₂, λ, q_a, with calibration certificate, power supply unit, flue gas probe immersion depth 300 mm, condensate filter cartridge, ambient air sensor, connection kit for gas fittings, protective housing with magnet, aluminium case.

Technical specifications

Flue gas temperature (including separate differential temperature measurement)

Meas. range: 0 °C/1,000 °C
Resolution: 1 °C
Thermocouple: NiCr-Ni (type K)

Outside wall / air temperature

Meas. range: -20 °C/+200 °C
Resolution: 0.1 °C
Thermocouple: NiCr-Ni (type K)

Draft/differential pressure

Meas. range: ±70 hPa (nominal)/
±130 hPa (max.)
Accur. of meas.: ±1 % of MV/±2 % of MV
Resolution: 0.01 hPa

O₂ measurement

Meas. range: 0/21 % by volume
Resolution: 0.1 % by volume
Accur. of meas.: ±0.2 % by volume of MV

CO₂ determination

Range: 0/CO₂ max.
Resolution: 0.1 % by volume
Accur. of meas.: ±0.2 % by volume

CO measurement (with H₂ compensation)

Meas. range: 0/4,000 ppm
Resolution: 1 ppm
Accur. of meas.: ±3 ppm (up to 20 ppm)
±5 % of MV (≥ 20 ppm)

Options

NO measurement

Meas. range: 0/2,000 ppm
Resolution: 1 ppm
Accur. of meas.: ±5 ppm (up to 50 ppm)
±5 % of MV (≥ 50 ppm)

CO measurement solid fuels:

Meas. range: 0/2.0 % by volume
(or 20,000 ppm)
Resolution: 0.01 % by volume
Accur. of meas.: ±5 % of MV ± 1 digit

SO₂ measurement

Meas. range: 0/2,000 ppm
Resolution: 1 ppm
Accur. of meas.: ±10 ppm
(up to 150 ppm)
±5 % of MV
(≥ 150 ppm)

NO₂ measurement

Meas. range: 0/200 ppm
Resolution: 1 ppm
Accur. of meas.: ±10 ppm (up to 50 ppm)
±10 % of MV
(≥ 50 ppm)

DG: H	Part no.	Price €
MULTILYZER NG O₂, CO_{H2}, differential pressure	69631A	
MULTILYZER NG O₂, CO_{H2}, NO, differential pressure	69632A	
MULTILYZER NG O₂, CO_{H2}, CO_{20,000}, differential pressure	69633A	
MULTILYZER NG O₂, CO_{H2}, CO_{20,000}, NO, differential pressure	69634A	
MULTILYZER NG – special equipment	69635	on request
Please enquire about maintenance contracts.		

Flue gas analysis computer MAXILYZER



TÜV By RgG 210



Special features:

- Dust and water-proof device housing with vent valve
- Most comprehensive sensor equipment: O_2 , CO_{H_2} , NO, $CO_{20,000}$ and SO_2
- 4 measured values on brightly backlit LCD display
- Additional flushing function, depending on measured concentration
- Automatic self-checking
- CO limit value monitoring with sensor protection function
- Graphic evaluation of measured values, combustion chart (online function)
- Innovative sensor core with selective filter replacement for prolonged service life
- Powerful rechargeable battery, approx. 24 hours of continuous use with active display backlit function
- Intelligent charging technology via external power supply unit
- Hold function, zoom function, core search function, conversion of units

MAXILYZER

This flue gas analysis computer with state-of-the-art technology and modern design features an integrated printer and gas treatment unit. The robust, waterproof plastic housing contains the microprocessor-controlled electronic system, the electro-chemical measuring cells and sensors and the flue gas distribution system. Optimised gas distribution to the sensors and an automatic CO flushing function via a second pump protect the sensors. An efficient gas treatment system is integrated in the case lid.

Measured parameters: O_2 , CO_{H_2} , (options: $CO_{20,000}$, NO and SO_2), flue gas temperature, combustion air temperature, differential pressure, differential temperature.

Calculated parameters:

CO absolute, λ , CO_2 , efficiency η , flue gas losses q_A . 15 minutes mean value programme for solid fuels.

When the lid is opened, all operating and connection elements are easily accessible on the upper side of the analyser. The connection pieces for pressure, temperature, charger, RS 232 interface and connections for the flue gas combination probe are located at the left hand side. The large, backlit graphic display is located in the centre. Below the centre are the three special

soft keys. The dot matrix printer for hardcopies on standard paper can be found at the bottom.

A foil keypad is located on the right hand side. The display has four lines with an additional status line, graphic presentation, zoom and „hold“ functions as well as an electronic core search function and sensor status diagnostics. Especially designed for the optimisation of solid fuel, pellet and condensing systems. The triple stage gas treatment unit is integrated in the case lid.

It features a condensate cartridge, a drying cartridge with drying beads and

a dust cartridge with Infiltec dust filter. This protects the analyser from humidity and dirt. The system is also equipped with the following components: memory for 100 to up to 250 measurement blocks, rechargeable battery for 24 hours of operation, power supply unit with intelligent rapid-charge technology.

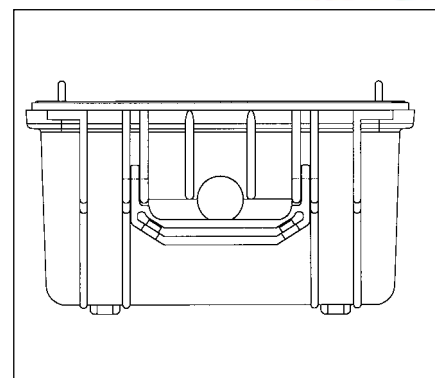
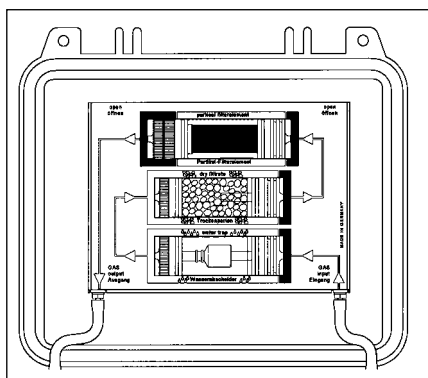
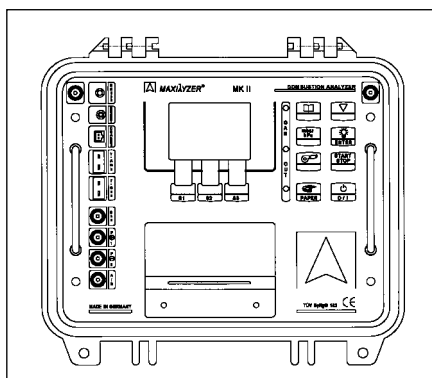
Scope of delivery:

MAXILYZER with 2, 3 or 4, max. 5 sensors. Case with battery charger, ambient air sensor, flue gas combination probe, operating instructions and accessories.

TÜV By RgG 210

DG: H	Part no.	Price€
MAXILYZER O_2 , CO_{H_2}	69193	
MAXILYZER O_2 , CO_{H_2} , NO	69194	
MAXILYZER O_2 , CO_{H_2} , $CO_{20,000}$, NO	69195	
Spare parts:		
Ambient air sensor (stub sensor)	69196	
Flue gas combination probe	69197	
Case for flue gas combination probe and accessories	69198	
Battery charger	69199	
Options: Immediate installation when instrument is ordered		
$CO_{20,000}$ ppm without solid fuel programme	69536	
$CO_{20,000}$ ppm with solid fuel programme	69535	
SO_2 -2,000 ppm	69537	
Infrared interface IrDA for data transmission	69534	on request
Printer paper (5 rolls)	69182	
Ink ribbon	24 02 000304	
Rechargeable battery	670 000 0004	
Please enquire about maintenance contracts.		

Flue gas analysis computer MAXILYZER



Technical specifications

Flue gas temperature:

Measuring range: 0 °C/+1,000 °C

Resolution: 1 °C

Thermocouple: NiCr-Ni (type K)

Outside wall/air temperature:

Measuring range: -20 °C/+200 °C

Resolution: 0.1 °C

Thermocouple: NiCr-Ni (type K)

Draft/differential pressure:

Measuring range: ±150 mbar

Resolution: 0.01 hPa

O₂ measurement:

(electrochemical measuring cell)

Measuring range: 0/20.9 % by vol.

Resolution: 0.1 % by vol.

CO₂ determination:

(calculation on the basis of O₂)

Range: 0/CO₂ max.

Resolution: 0.1 % by vol.

CO measurement

(electrochemical measuring cell, with H₂ compensation):

Measuring range: 0/4,000 ppm

Resolution: 1 ppm

Options:

CO measurement solid fuels:

(without H₂ compensation):

Measuring range: 0/2.0 % by vol.
(20,000 ppm)

Resolution: 0.01 % by vol.

NO measurement:

(electrochemical measuring cell)

Measuring range: 0/2,000 ppm

Resolution: 1 ppm

SO₂ measurement:

(electrochemical measuring cell)

Measuring range: 0/2,000 ppm

Resolution: 1 ppm

Weight: Approx 2.8 kg

Dimensions W x H x D:

273 x 178 x 247 mm

Gas treatment system for MAXILYZER

Maintenance information

Handle the gas treatment system with patented water stop system with special care in order to ensure maximum protection of your MAXILYZER analysis computer.

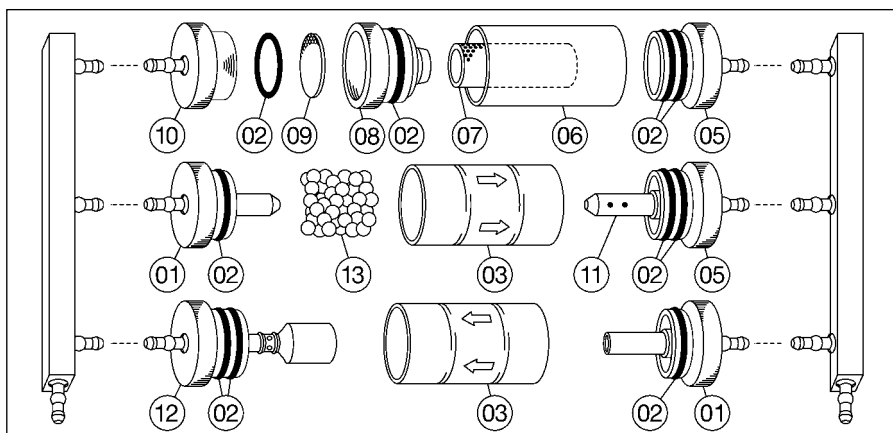
Ensure that the following parts are replaced in good time:

09 Teflon membrane

07 Infiltec fine filter

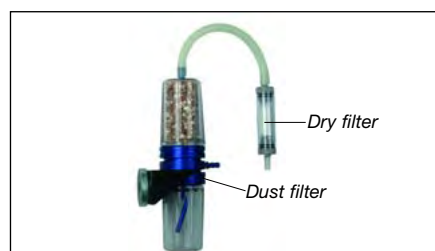
13 Drying beads

It is recommended to order these parts along with the system.



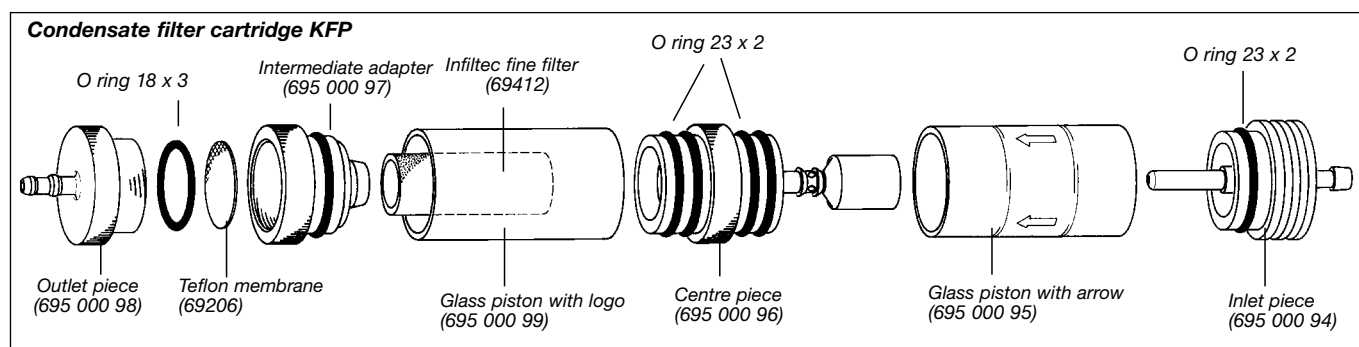
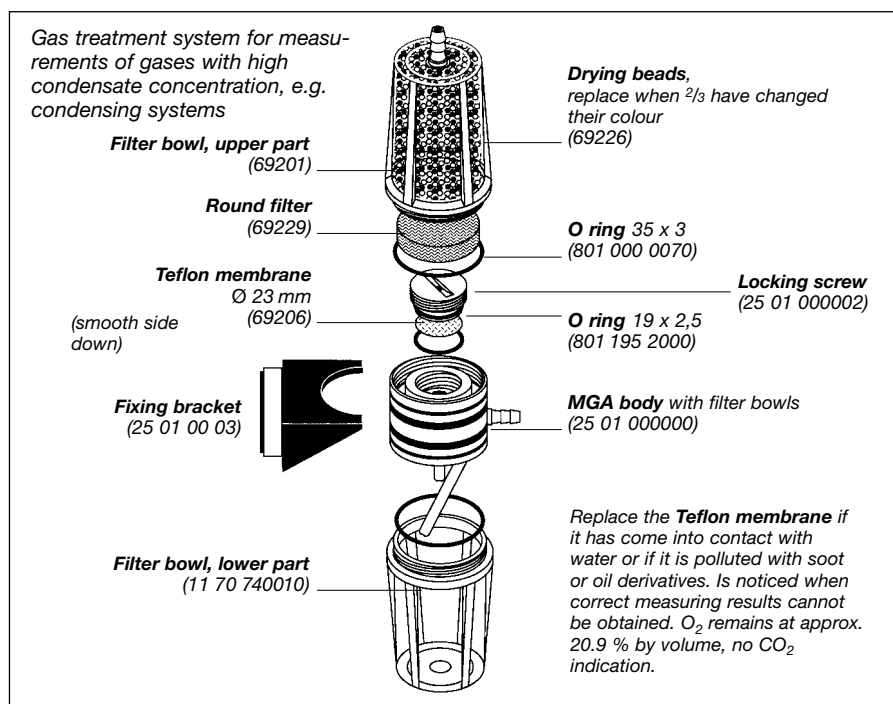
DG: H	Part no.	Price €
Spare parts for the gas treatment system MAXILYZER		
01 Inlet piece	695 000 94	
02 Assortment of O rings	69427	
03 Glass piston with arrow	695 000 95	
05 Inlet piece particle filter element	695 000 93	
06 Glass piston with logo	695 000 99	
07 Infiltec fine filter, 5 pieces	69412	
08 Intermediate piece	695 000 97	
09 Teflon membrane Ø 23.5 mm, 10 pieces.	69206	
10 Outlet piece	695 000 98	
11 Filter pipe M6	695 000 92	
12 Outlet piece with cylinder	695 000 91	
13 Drying beads, 850 ml can	69226	
Please enquire about maintenance contracts.		

Condensate filter and gas treatment system for portable flue gas analysers



Gas treatment system MGA-1

The MGA-1 gas treatment unit protects the portable flue gas analysers from humidity and dirt. MGA-1 separates the humidity in the bottom condensate bowl and dries the gas sample in the upper condensate bowl. The degree of saturation is indicated by a change in colour. The membrane retains soot, dirt and water. Especially suitable for measurements of gases with high condensate concentration (gas furnaces and condensing systems).



DG: H	Part no.	Price €
Gas treatment system MGA-1	69207	
Teflon membrane (10 pieces)	69206	
Round filters (25 pieces)	69229	
Dust filters (25 pieces)	69225	
Dust filter complete	69230	
O rings 19 x 2,5 (4 pieces)	801 195 2000	
O rings 35 x 3 (4 pieces)	801 000 0070	
Dry beads 850 ml can	69226	
Upper filter bowl for MGA-1	69201	
Lower filter bowl for MGA-1	11 70 740010	
Locking screw	25 01 000002	
Condensate filter cartridge KFP	69411	
Infiltec fine filter (5 pieces)	69412	
Assortment of O rings	69427	
Inlet piece	695 000 94	
Glass piston with arrow	695 000 95	
Centre piece	695 000 96	
Intermediate adapter	695 000 97	
Outlet piece	695 000 98	
Glass piston with logo	695 000 99	
Teflon membrane (10 pieces)	69206	

Mobile gas treatment system MAXISYSTEM



MAXISYSTEM

Portable gas treatment system for long-term measurements and applications on different sites requiring high-precision gas analyses and involving pollution and condensate in the flue gas.

The electronically controlled Peltier cooler prevents the formation of condensate and the precipitation of pollutants in the flue gas analyser by reducing the dew point temperature. MAXISYSTEM is particularly helpful if highly water-soluble gases (such as NO₂ and SO₂) are to be analysed.

The complete gas treatment system is contained in a small, robust case to ensure accurate and reproducible analyses quickly and with high reliability. This is most important for demanding gas analysis applications.

Gas withdrawal probe PSP 4000



With external ceramic filter element

Description

The basic version of the portable gas treatment system MAXISYSTEM features all required functions and components:

- Gas cooling:
Gas cooling with Peltier gas cooler
- Gas filtering:
Fine dust filter
- Gas transport:
Gas pump in MAXILYZER
- Condensate transport:
Condensate removal by means of hose pump

The gas treatment system is equipped with a status recognition unit for the detection of the operating status of the cooler and the heating hose. When the condensate alarm LA+ is activated, the 3/2-way solenoid valve for free suction from the MAXILYZER instrument is opened and the internal gas pump (option) of the MAXISYSTEM is switched off. In addition, there is a mains switch and a switch for the internal gas pump.

Technical specifications

Gas cooler:

- Gas inlet: Max. 60 °C dew point, 100 °C gas temperature
- Ready for operation after app. 15 min.

Gas flow and filtering:

- 70 l/h at 200 mbar
- Fine dust filter with glass fibre filter 2 µm

Status indication via LED at the front:

Temperature of cooler and heating hose, status „Cooling active“ as well as condensate alarm LA+

Connection:

Hose NW 3 mm, hose connector, plug-in

Wetted parts:

Duran glass, PVDF, Viton, stainless steel

Supply voltage:

AC 230 V/50 Hz, 60 W

Operating and storage temperature:

+8 °C/+40 °C and -15 °C/+55 °C

Protection (EN 60529):

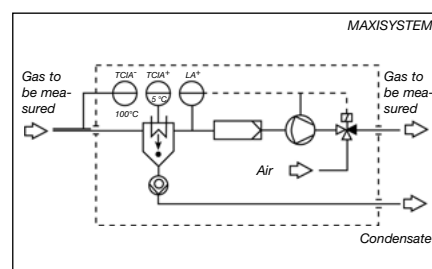
IP 20 operating condition (open), IP 65 closed

Dimensions and weight:

W x H x D: 273 x 178 x 247 mm
approx. 4 kg

Gas flow chart

(shown with options)



DG: H	Part no.	Price €
MAXISYSTEM with controller for heated pipe and condensate pump without gas pump, with mains cable	69486	
Gas pump 60 l/h and activation pump ON/OFF when cooler is ready for operation	69486A	on request
Condensate alarm condensate alarm LA+ pump „off“ switching and activation of 3/2 way valve Teflon/Viton	69486B	on request
Probe 300 mm with accessories, not heated Hose for condensate outlet 300 mm, 1 m connection hose with 2 female connectors	69485	
Gas sampling probe PSP 4000, portable, heated Probe temperature +100 °C/+180 °C, adjustable	68900	
Heated line 5 m type WAP 183/04/030 with thermocouple PT 100	69476	
Heated line 3 m type WAP 183/04/030 with thermocouple PT 100	69478	

Water analysis instruments



AQUALYZER

Handheld measuring instruments for connection of one or several sensors, with microprocessor and memory. The instruments can be operated via battery or mains. The AUTO store function allows the units to be used as a data logger. The stored measured values can be read easily and processed further on a PC with the corresponding software. Depending on the requirements, the instruments are equipped with temperature and pressure measurement facilities. Calibration solutions are supplied for the calibration of the instruments. An instrument case is available as an option.

AQUASYSTEM

Compact, stationary measuring instruments for the connection of one sensor or electrode with 4-20 mA or 0-2 V output each. The sensors and electrodes are calibrated via the transmitter and the measured value is temperature/pressure compensated, if required. The optional PC software and the RS 232 interface allows the measured values to be processed further.

DG: E	PU	Part no.	Price €
AQUALYZER 8130 pH: 0-14, temperature 0-50 °C	1	69660	
AQUALYZER 8110 O ₂ : 0.1 - 30 mg/l, temperature 0-50 °C	1	69661	
AQUALYZER 8120 Conductivity: 0-20 µS/cm or 0-20 mS/cm, temperature 0-50 °C	1	69662	
AQUALYZER 7030 pH 0-14, O ₂ : 0.1-30 mg/l, redox: ±900 mV, conductivity: 0-20 mS/cm, temperature: 0-50 °C	1	69663	
AQUALYZER ISE (refer to page 478)	1	69664	on request
Case	1	69665	
All prices include sensors, cables and plugs.			
AQUASYSTEM 7430 pH: 0-14, temperature: 0-50 °C	1	69666	
AQUASYSTEM 7405 Redox: ±900 mV, temperature: 0-50 °C	1	69667	
AQUASYSTEM 7410 O ₂ : 0.1-40 mg/l, temperature: 0-50 °C	1	69668	
AQUASYSTEM 7420 Conductivity: 0-200 µS/cm; 0-20 mS/cm Temperature: 0-50 °C	1	69669	
AQUASYSTEM ISE (refer to page 478)	1	69670	on request
IVM-IS74xx PC software (calibration, configuration, data recording)		69671	
All prices include sensors, cables and plugs.			

Please refer to pages 477 and 478 for sensors.

Sensors and electrodes for water analysis instruments



pH measurement

The pH value is a measure of the alkalinity or acidity of an aqueous solution. The scale reaches from 0 (highly acid) to 14 (highly alkaline). On the basis of this scale, liquids are referred to as acidic (e.g. hydrochloric acid), neutral (e.g. distilled water) and alkaline (e.g. sodium hydroxide). The pH value can be measured by means of electrochemical measuring systems which consist of a measuring and a reference electrode. In the case of a single-rod probe, the two electrodes are integrated in a single housing. When the probe is submerged in the solution to be measured, a voltage is generated between the measuring and the reference electrode which is characteristic of the corresponding pH value. This voltage is detected by the instrument, converted into the pH value and displayed.

Application areas:

- Drinking water monitoring
- Pool water monitoring
- Municipal and industrial sewage plants
- Production and process control (e.g. chemical, paper, textile, paint industries)
- Power plants (boiler feed water, corrosion)
- Food production (dairies, sugar plants, breweries, etc.)

Redox measurement

The term redox comes from the two concepts of reduction and oxidation, the designations for chemical reactions of oxygen with other substances. The term relates to reactions in which one part gains electrons (reduction) and one part loses electrons (oxidation).

Everyday redox reactions:

- Iron rusts.
- Verdigris is generated when copper is exposed to the weather.
- Silver tarnishes.

In aqueous solutions, there is a redox voltage between two electrodes consisting of different metals. It is a measure of the different potential of the metals to lose electrons. As a result, the (less noble) metal is dissolved (oxidation) and the nobler metal is separated from the solution (reduction). The redox voltage is measured by means of a redox probe. Just like the pH probe, it consists of a measuring and a reference electrode (single rod probe).

Application areas:

Redox measurements are performed wherever chemical reactions have to be monitored.

Examples include denitrification of waste water (determination of redox

inflexion point), monitoring the disinfection of cleaning agents or decontamination of electroplating solutions.

Oxygen measurement

More or less oxygen is dissolved in virtually every liquid. For example, water contains approx. 9 mg/l of oxygen at a temperature of 20 °C and an atmospheric pressure of 1013 mbar if it is saturated. Each liquid takes up oxygen until the partial pressures in the liquid and in the air or gas in contact with the liquid have reached equilibrium.

The oxygen concentration is determined by means of an electrochemical sensor. The simplest type of oxygen sensor contains two electrodes. Both electrodes are located in an electrolyte system which is separated from the sample by a membrane. At one electrode, oxygen is reduced to hydroxide ions, at the other electrode, ions are oxidised to oxygen. During this electrochemical reaction, a current flows between the two electrodes in the sensor if they are connected. The higher the oxygen concentration in the solution, the greater the current signal. The oxygen measuring instrument uses a solubility function to calculate the oxygen concentration in the solution on the basis of this signal.

Application areas:

- Waster water treatment, e.g. optimisation of the cleaning quality, monitoring of decomposition processes
- Water monitoring, e.g. monitoring the conditions of marine life, e.g. fish and microorganisms
- Drinking water quality, evaluation, prevention of corrosion damage
- Beverage industry, e.g. drink-by dates
- Fish farms, e.g. cost optimisation (oxygen supply)

Sensors and electrodes for water analysis instruments



Conductivity measurement

The electrical conductivity is a measure of the electrical current between two points (electrodes) with different potential (voltage), e.g. in a liquid. The more minerals, acids or bases a solution contains, the greater its conductivity. The unit for conductivity is S/m. The scale for aqueous solutions begins with pure water with a conductivity of 0.05 $\mu\text{S/cm}$ (25 °C) and ends with some bases with a conductivity of 1,000 $\mu\text{S/cm}$ (e.g. potassium solutions). The conductivity of natural water such as drinking water or surface water is in the range of 100-1,000 $\mu\text{S/cm}$.

The conductivity is measured by means of a measuring cell which, in the simplest case, consists of two electrodes. An alternating voltage applied at one electrode causes the ions contained in the solution to move to the electrode. The more ions in the solution, the greater the current between the electrodes. The instrument uses the measured current to first calculate the conductance and then the conductivity level depending on the cell data.

Application areas:

- Boiler feed water monitoring: lime causes damage to the pipes.
- Monitoring of industrial facilities: production of ultra-pure water, drinking water treatment, demineralisation of water for cooling plants, waste water monitoring
- Food industry: milk, beverages, beer, bottle cleaning and CIP systems

Ion-selective electrodes ISE (e.g.: NO_3^- , NH_4^+ , F^- , Cl^- , $\text{Ag}^+/\text{S}^{2-}$)

Ion-selective electrodes enable the determination of activities or concentrations of exactly one type of ion in liquids, irrespective of colouration and turbidity. The measurement is performed by submerging an ion-selective electrode and a reference electrode in the sample solution and measuring the cell voltage. Silver electrodes, silver chloride electrodes and saturated calomel electrodes are primarily used as reference electrodes.

Application areas:

- Water supply and distribution: monitoring of drinking water, process and surface water. Fluoride concentrations in fluorinated drinking water, water hardness, chlorine content, sulphate and sulphide in natural waters.
- Agriculture: examination of the nutrient content and fertiliser requirements in terms of nitrate, chloride, fluoride, sodium, calcium, potassium and iodide.
- Medical technology: fluoride in tooth enamel, chloride, calcium, potassium, sodium and enzymes in the blood, serum and urine as well as chloride in body perspiration.

- Chemical industry: monitoring of base and laboratory chemicals, silver and halogen concentrations in the production of photo emulsions. Checking washing water in the photo-chemical industry.
- Food industry: measurement of nitrate due to its potential toxicity in food, in particular fresh vegetables, determination of the salt content in meat, fish, milk, vegetable and fruit juices with chloride electrodes.
- Metallurgy: checking etching, flushing and electroplating solutions for silver, copper, fluoride, chloride and cyanide.

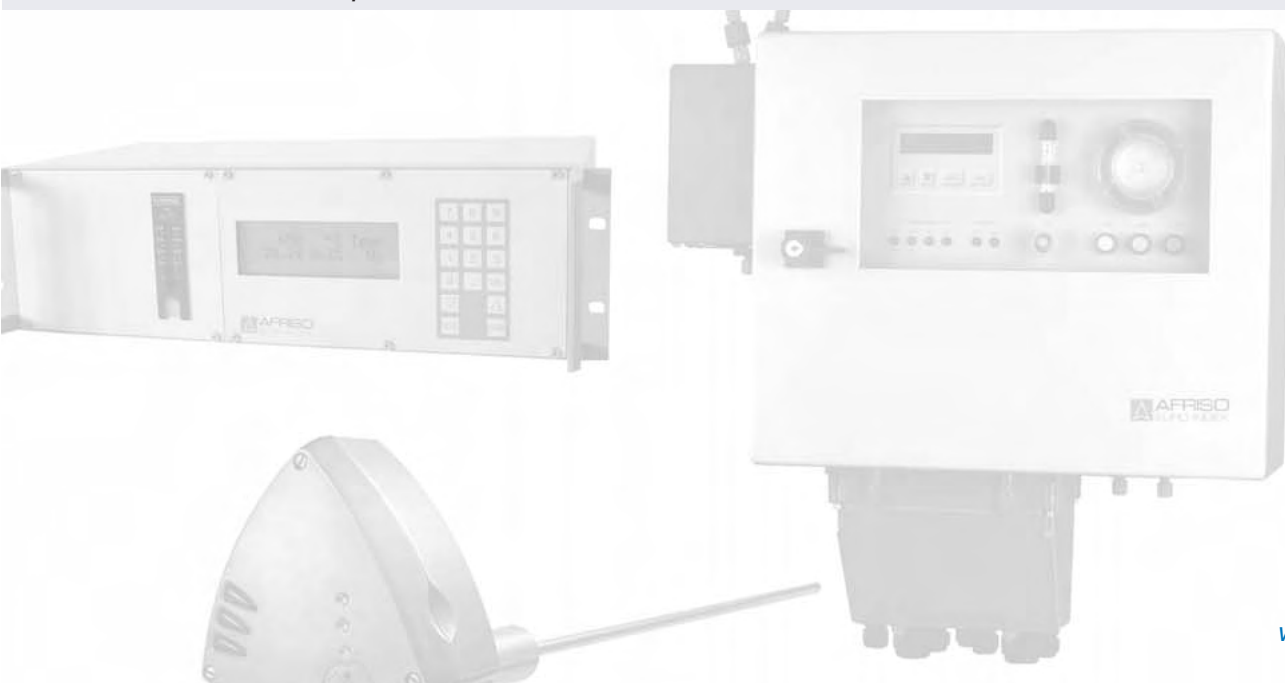
DG: E	PU	Part no.	Price €
ph single rod probe for connection to AQUALYZER 7030, 8130 or AQUASYSTEM 7430	1	69650	
Redox single rod probe for connection to AQUALYZER 7030 or AQUASYSTEM 7405	1	69651	
Oxygen sensor for connection to AQUALYZER 7030, 8110 or AQUASYSTEM 7410	1	69652	
Conductivity measuring cell for connection to AQUALYZER 7030, 8120 or AQUASYSTEM 7420	1	69653	
Ion-selective electrodes ISE (please enquire for separate data sheets) for connection to AQUALYZER ISE or AQUASYSTEM ISE.	1	69654	on request

Chapter 13

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Stationary gas analysis

General information on gas concentration measurement

Task

The basic objective of gas concentration measurement is to measure one of the components of a gas mixture continuously, selectively and quantitatively. The result is then transformed into an electrical, standardised signal. This signal can be processed for logging, control, calculation or analysis purposes.

Each gas component is measured on the basis of different chemical/physical or physical principles of measurement. Such principles include:

- Absorption of infrared radiation (for measuring heteroatomic gases)
- Paramagnetism (this method measures oxygen concentrations)
- Ion conductivity of solid electrolytes and liquid electrolytes

Before specifying a suitable measuring system, one must give consideration to the selectivity of the component to be measured. Selectivity refers to the specific technical detectability of a certain component in the measuring gas without it being influenced by other gases.

Application

The analysis of gas mixtures with continuously operating measuring systems is a part of industrial measuring technology. By using continuously operating gas analysis units it is possible to recognise tendencies, monitor, control and/or evaluate processes.

The technical analysis of gas emissions is prescribed by numerous environmental acts in many countries. For example, in Germany, the directives such as TA-Luft and BImSchG stipulate, that certain systems must be equipped with emission measuring facilities. AFRISO supplies tested and approved analysers, turn-key analysis systems and/or auxiliary equipment (such as gas withdrawal probes, filters, coolers) for such applications. These units make continuous analysis of gas components possible. Other typical application areas include:

- Biological systems
- Tunnel monitoring
- Cooling plants
- Fruit and vegetable storage halls
- Purity measurements

Design features

Due to the varied nature of measuring tasks and gas components, it is imperative to consider the operating conditions and ambient conditions in addition to the selection of the measuring principle and the measuring range. Therefore, when planning a measuring system, the operating conditions (such as pressure, temperature, humidity, dirt accumulation) and the ambient conditions (such as ambient temperature, corrosive environments, vibrations, dust concentration) must be taken into consideration.

Gas treatment

The accuracy and the reliability of a gas analysis system is very much determined by the selection of the

gas withdrawal unit and the gas treatment.

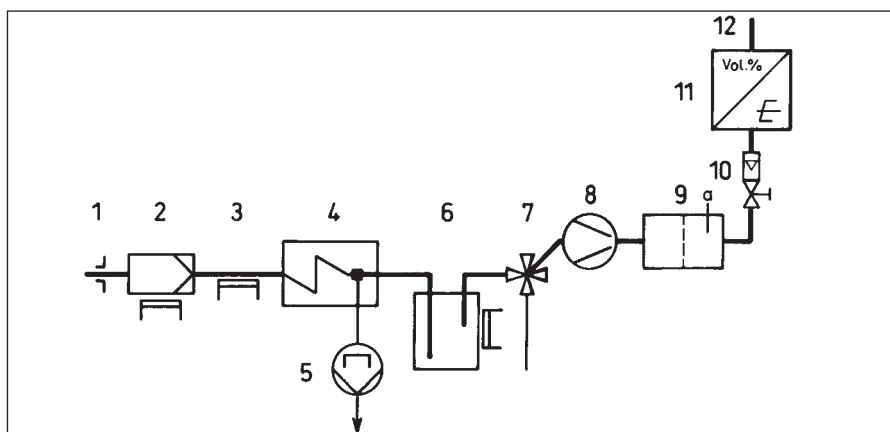
In most cases, the gas withdrawn for analysis cannot be directly processed by the gas analyser. The performance of the analyser can be adversely affected by high dust concentrations or high humidity, high dew points, too high or too low pressures, too high temperatures as well as other detrimental influences.

The design of the gas analysis system is a crucial factor for the usability of the analysis values generated by the analyser. The most important conditions for minimum maintenance and trouble-free operation are the determination of the withdrawal point, the use of suitable accessories and their proper arrangement.

A proper application related gas treatment is a prerequisite for accurate gas analysis. Take advantage of AFRISO's many years of experience and competence as a supplier of complete analysis systems for solutions to your measuring problems. AFRISO supplies analysis systems:

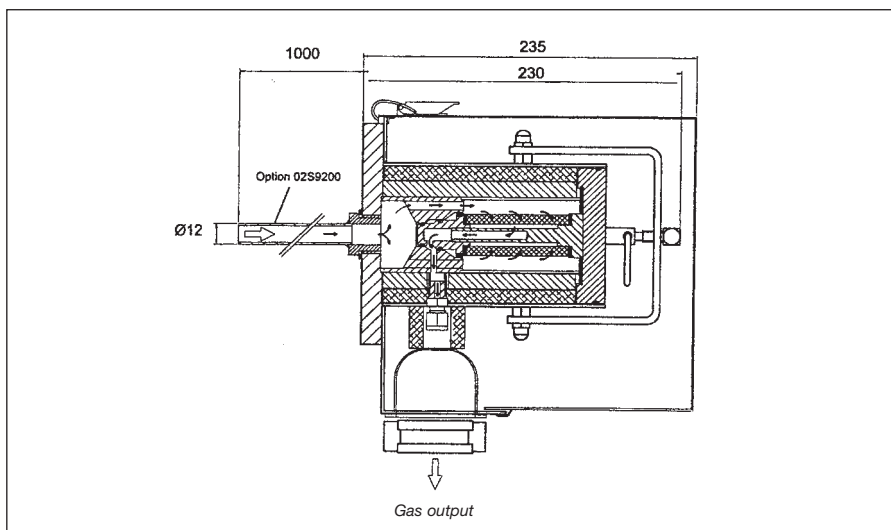
1. Individual system components
2. Completely mounted on a panel, wired, with capillary tubes readily connected.
3. Completely mounted, wired, with capillary tubes connected and installed in a control cabinet.
4. As a complete measurement station in a container or built onto a vehicle.

Custom-built units to your specifications - please enquire.



1. Withdrawal point
2. Gas withdrawal probe
3. Heated gas tube or pipe
4. Cooler
5. Condensate separation
6. Filter
7. Changeover cock
8. Gas pump
9. Flow monitor
10. Flow meter
11. Analyser
12. Gas output

Stationary gas withdrawal probes



Application

With continuous gas withdrawal, the fine dust is removed directly at the withdrawal point through the withdrawal probe. Part of the required maintenance of the complete analysis system is thereby focussed on the first element in the chain of components. This filter technology has the advantage of retaining mixtures of particle matter and coarse dust and reduces maintenance to a minimum. Optimum adaptation of the withdrawal probe to the process conditions and the measuring task is a prerequisite for optimum performance of the complete measuring system.

Gas withdrawal probe

Stationary gas withdrawal probe (standard version) with external electrically heated ceramics filter. With mounting flange and G³/₄ female thread for withdrawal pipe or prefilter. A deep-bed filter element with a large surface is located in a housing with a low dead volume outside of the withdrawal space. The filter element is easy to replace. There are no tools required and the heated pipe does not need to be dismantled. Optimum heating of the complete filter housing including the mounting flange ensures reliable operation without dew point problems at external areas. The unit is heated to +180 °C by means of self-controlling heating elements. Therefore, heating controllers are not required. A thermoswitch monitors the withdrawal probe for low temperatures.

A 1 m long stainless steel withdrawal pipe is available as an optional item. It is screwed into the G³/₄ thread. The modular probe design allows for the combination of various materials and withdrawal methods and ensures optimum adaptation to the process conditions.

Features:

- Low dead volume, fast response
- Simple filter replacement
- Easy cleaning of filter space and withdrawal pipe
- Self-controlling electrical heating system with low temperature alarm contact
- Small footprint
- Easy installation

Please enquire for other gas withdrawal probes as well as heated gas withdrawal pipes.

Technical specifications

Version SP210-H

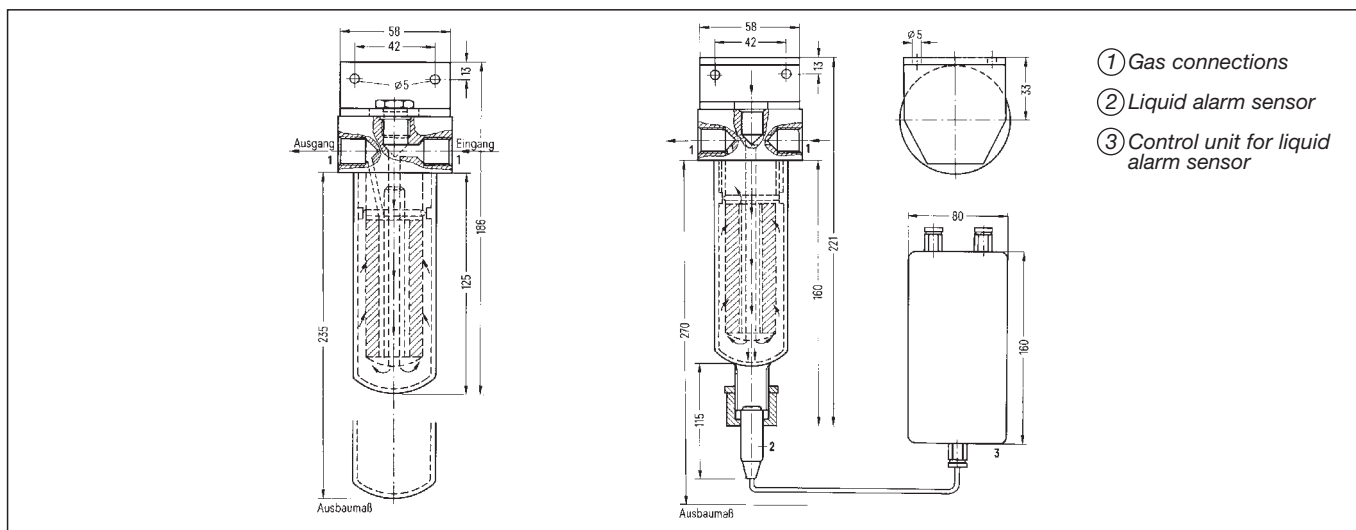
Protection: IP 54 (EN 60529)
Withdrawal pipe: SP210/SS optional
Withdrawal temperature: max. 600 °C
Withdrawal pressure: 0.4/2 bar absolute
Ambient temperature:
 -20 °C/+80 °C
Dust admission: max. 1 g/m³
 Filter space volume: 100 ml
Filter element:
 Type F-2K, filter mesh 2 µm, ceramic
Probe heating:
 +180 °C, self-controlling
Ready for operation: after 2 h
Low temperature alarm contact:
 Switch point <160 °C
 Switch rating AC 250 V, 3 A, DC 30 V, 3 A
Connection gas output:
 1/4-NPT female with Swagelok pipe connector Ø 6 x 1 mm
Supply voltage:
 AC 110 to 240 V, 50/60 Hz
Power consumption:
 Starting phase: 400 VA, operation: 70 VA, fuse 6 A
Mounting flange: DN 65 PN 6, design B, stainless steel 1.4571
Wetted parts:
 Stainless steel 1.4571, FFM, ceramic
Dimensions W x H x D:
 170 x 220 x 230 mm
Weight: 6.5 kg

Version SP210-H/W

With weather protection hood
Dimensions W x H x D:
 170 x 220 x 235 mm
Weight: 8.5 kg
Otherwise as SP210-H

DG: E	PU	Part no.	Price €
Gas withdrawal probe SP 210-H, heated	1	68935	
Gas withdrawal probe SP 210-H/W, heated	1	68936	
Accessories:			
Stainless steel withdrawal pipe Length 1,000 mm, for max. temperature of 600 °C	1	68940	
Titanium withdrawal probe Length 1,000 mm, for highly corrosive gases and a max. temperature of 600 °C	1	68941	
Kanthal withdrawal probe For max. temperatures of 1,300 °C	1	68942	
Prefilter for dust admission 2-16 g/m³	1	68945	on request
Prefilter for dust admission >10 g/m³	1	68946	on request
Filter element F-2K 2 µm, ceramic	1	68950	
Please enquire for special probe design and heated gas pipes.			

Universal filters for gas analysis



Universal filter, not heated

Filters are used to remove solid matter from gases to be analysed. For optimum filtering performance and removal of extremely small particles, very fine and efficient filter elements are used. The filters are available with or without liquid alarm sensors. The liquid sensor can detect ingress of liquids (e.g. if a gas dryer, used upstream of the unit, is defective).

If condensate water leaks through, the stream flow effect directs the drops to the sensor. The liquid sensor uses the conductivity measurement principle. The electronic control unit for the liquid alarm sensor has a relay output which can be used to operate a pump or a solenoid valve or to signal an alarm. If condensate leaks through, the filter housing acts as a buffer space to prevent the liquid from reaching other components immediately.

Technical specifications

Gas connections:

Inlet: Top or side
Outlet: side only
3 x G¹/₄ female threads

Filter housing: Makrolon

Filter insert:

Teflon (PTFE), mesh size 2 µm or glass fibres, mesh size 0.1 µm

Gas pressure: Max. 5 bar

Filter surface: 70 cm²

Dead volume: 65 cm³

Mounting:

Wall mounting with bracket

Ambient temperature for evaluation electronics:

-5 °C/+55 °C

Relay output:

Relay contact: 1 voltage-free changeover contact

Contact rating: AC 250 V, 750 VA
DC 12 V, 1 A

Sensor cable length: 1.5 m

Supply voltage:

AC 230 V or AC 115 V

Power consumption: 2 VA

Dimensions: refer to drawing

Weight:

Universal filter approx 0.31 kg
Evaluation electronics approx. 0.35 kg

Please enquire for other filters, variable area flow meters, gas pumps, solenoid valves, change-over cocks, heated withdrawal pipes and other gas treatment equipment.

DG: E	PU	Part no.	Price €
Universal filter with filter insert Teflon (PTFE), pore size 2 µm	1	68960	
Universal filter type FT-3G-H2 Heats up to a max. temperature of 180 °C. To be used if the complete measurement system must be heated for process or measurement reasons.	1	68971	
Accessories:			
Suspended washing bottle type FP-W to wash individual components of the sampled gas.	1	68961	
Liquid alarm sensor with electronic control unit	1	68965	
Filter insert Teflon , mesh size 2 µm	1	68966	
Filter insert glass fibre , mesh size 0,1 µm	25	68967	
Screw connection G¹/₄ with hose connection	1	68970	
Empty cartridge FP-AP Transparent PVC, for adsorption or absorption agents	1	68972	

Gas treatment system MGK 744



Gas treatment system MGK 744

Compact, portable and stationary gas treatment system in 1/2 19" housing for gas analysis systems which withdraws a gas sample for the analysis process. Especially for long-term or continuous measurements and measurements involving pollution and/or condensate. Crucial for accurate and reproducible measuring results.

Description

The unit consists of a half 19" rack unit with permanently installed Peltier gas cooler which cools the gas to be measured to a temperature of +5 °C, irrespective of the withdrawal temperature or the ambient temperature. With hose pump for automatic condensate removal, gas pump, dust particle filter and flow meter with needle valve.

The gas treatment system is equipped with a status detection unit to show the operational state of the cooler and also an additional master switch for the gas pump.

Gas cooler

Peltier gas cooler for cooling the gas to +5 °C.

Gas filter

Fine dust filter

Gas flow

Flow setting using a rotameter and needle valve

Gas transport

Gas pump

Condensate transport

Condensate removal by a hose pump

The following options are available:

Options

- 3/2-way solenoid valve (operation via switch on the front or via digital input)
- Portable housing 1/2 19", 3HU

Technical specifications

Gas output dew point: +5 °C

Gas input:

Max. 40 °C dew point, max. 80 °C gas temperature at 50 l/h and 20 °C ambient temperature

Ready to operate:

After approx. 15 min.

Gas flow and filtering:

- 60 l/h at 200 mbar
- Fine dust filter with glass fibre filter 2 µm

Status indication of gas cooler via LED at the front:

Temperature OK, cooling active, fault

Connection:

Capillary tube: 4 x 1 mm, clamping ring connection

Wetted parts:

Duran glass, PA, PC, Viton

Supply voltage:

AC 230 V/50 Hz, 60 W

Operating temperature range:

Ambient: +5 °C/+40 °C
Storage: -15 °C/+55 °C

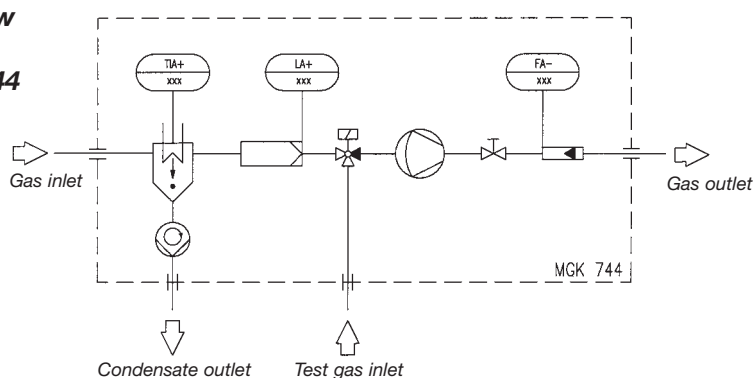
Protection: IP 20 (EN 60529)

Dimensions and weight:

W x H x D = 42 DU x 3 HU x 290 mm
approx 4.5 kg

DG: E	Part no.	Price €
Gas treatment system MGK 744	69640	
Additional cost for 3/2-way solenoid valve	69641	
Additional cost for portable housing	69642	

Gas flow chart MGK 744



Gas cooler MGK 741



Application

Gas coolers are used in gas analysis systems to reduce the dew point of humid gases in order to prevent condensation in the analysis system. Setting a stable gas output dew point prevents vapour cross sensitivity and volumetric errors.

Description

Peltier gas cooler, compact, low maintenance and self-monitoring. Intelligent detail solutions ensure optimum cooling of the gas, reduce the wash-out effect to a minimum and guarantee reliable separation of the condensate. The condensate is automatically discharged via an integrated hose pump. The heat exchanger consists of Duran glass and is fitted in a heat-insulated cooling block. The heat is discharged by a fan through cooling fins. LEDs are used to indicate the operating state. High and low temperature alarms are available as general alarms via a relay contact (voltage-free changeover contact). The compact and space saving design enables easy integration in stationary gas treatment systems.

Features:

- Virtually maintenance-free no moving parts
- Temperature monitoring
- Low dead volume for short analysis times
- Resistant to shocks and vibrations
- Small dimensions and low weight

Technical specifications

Heat exchanger

Single-stage Duran glass reverse unit

Gas input conditions

max. 40 °C dew point and max. 120 °C gas temperature at 50 l/h and 20 °C ambient temperature

Ready to operate

After approx. 15 min.

Status alarm

Voltage-free changeover contact
AC 120 V 0.5 A, DC 48 V, 1 A

Mounting

Wall mounting

Connection

Capillary tube: 4 x 1 mm, clamp ring connection

Wetted parts

Duran glass, PVDF, Viton, stainless steel

Supply voltage

AC 230 V, 50 Hz

Operating temperature range

Ambient: +5 °C/+40 °C

Storage: -15 °C/+55 °C

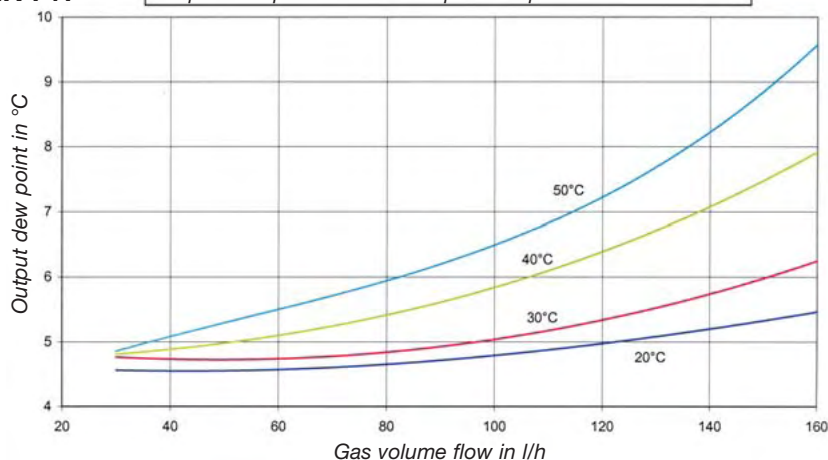
Dimensions and weight

W x H x D = 230 x 230 x 95 mm, approx. 3.5 kg

Characteristics

MGK 741

Output dew point relative to input dew point and volume flow



Other gas coolers, e.g. compressor type, on request.

DG: E	Part no.	Price €
Gas cooler MGK 741 with hose pump	69510	

Infrared gas analysers



Application

- Room air control (CO, CO₂, coolants)
- Monitoring of activated carbon filters (CO, CO₂)
- Monitoring of inertness (CO₂, O₂)
- Monitoring of biological processes (CO₂, O₂)
- Measurement of landfill gases (CH₄, CO₂)
- Monitoring of cold stores (O₂, coolants)
- Optimisation of heating systems (CO, O₂)

Description

This NDIR unit provides continuous operation and can selectively measure and display the concentrations of up to four different gas components. The NDIR function principle is based on the absorption of infrared radiation by heteronuclear molecule gases with several atoms. Optimum sensitivity and high selectivity with regard to other components in the measurement gas are achieved by means of opto-pneumatic radiation receivers which are optimised for the application. Due to a built-in thermostat, even extremely small measuring ranges can be covered. An optional electro-chemical sensor makes it possible to additionally measure the oxygen concentration. Measuring range for oxygen up to 25 % by vol.

Type-tested according to German directives

(TA-Luft and BImSchV 13 and 17)

for the following components:

- 0/250 mg CO
- 0/500 mg SO₂
- 0/400 mg NO
- 0/10/25 O₂ % by volume

A pressure-proof capsule version allows for use in Ex area, zones 1 and 2. The spectrum of measured components and combinations is growing constantly. An AFRISO expert will be pleased to answer any questions you have concerning your application. The conventional method with test gas can be used for calibration.

Measuring range (selection) smallest measuring ranges

CO	0 to	200	ppm
CO ₂	0 to	100	ppm
CH ₄	0 to	500	ppm
SO ₂	0 to	1000	ppm
C ₃ H ₈	0 to	100	ppm
C ₆ H ₁₄	0 to	500	ppm
NO	0 to	1000	ppm
N ₂ O	0 to	100	ppm
Frigen 11	0 to	500	ppm
Frigen 12	0 to	100	ppm
Frigen 13b	0 to	100	ppm
O ₂	0 to	10/25	Vol.-%

Please enquire for other components or different versions of the system.

If the integrated calibration unit is used, test gas cylinders are not required. In addition, the system can be equipped with a pneumatic unit. It is also available in a housing for wall mounting.

Technical specifications

Supply voltage: AC 230 V

Gas throughput: 20/100 l/h

Analogue output: 4-20 mA

Interface: RS 232 C/V.24

Display:

4-digit, backlit LCD display

Setup time: 15 s

Warming up time: 30 min.

Weight: approx. 10 kg

Design: 19" rack mounting or wall mounting

DG: E	PU	Part no.	Price €
IR Analyser CO as 19" unit	1	69966	
IR Analyser CO₂ as 19" unit	1	69967	
IR Analyser NO as 19" unit	1	69968	
IR Analyser SO₂ as 19" unit	1	69969	
IR Analyser CO/CO₂ as 19" unit	1	69971	
IR Analyser CO/NO as 19" unit	1	69972	
IR Analyser CO/SO₂ as 19" unit	1	69973	
IR Analyser NO/SO₂ as 19" unit	1	69974	
IR Analyser NO/CO₂ as 19" unit	1	69975	
IR Analyser NO/CO/SO₂ as 19" unit	1	69976	
Additional costs:			
Additional cost for O₂ measurement	1	69977	
Additional cost for wall mounting housing	1	69970	on request
Calibration unit for 1 IR component	1	69981	
2 calibration units for 2 IR components	1	69982	
Pneumatic unit (pump, flow monitoring)	1	69983	
2nd measuring range for single channel unit	1	69986	
2nd measuring range for multi channel unit	1	69987	

Oxygen probe Oxystem



Features:

- In situ measurement directly in the gas duct
- Compact design
- Error-proof oxygen sensor
- No gas treatment required
- No test gas for calibration required

Oxystem 300/Compact

This compact electronic oxygen measuring probe is designed for stationary installation. It consists of a 300 mm long zirconium dioxide measuring probe with an adjustable screw fitting and control electronics.

Measuring range: 0.3 to 24.6 % O₂ by volume

Output: 0-10 V, alternative 4-20 mA

Application

For monitoring combustion and production processes as well as storage facilities, storage containers which require the oxygen concentration to be measured and/or controlled. The unit provides inline oxygen measurement without gas treatment.

A reliable dynamic zirconium dioxide O₂ probe is used to generate the measured values. The advantages of the device result from the operating principle of the O₂ probe. The probe is calibrated in atmospheric air. No reference gases are required. Due to the small compact design, the probe can be easily installed in the flue gas pipe. The probe provides fast and accurate measuring results.

Oxystem 300/Compact is suitable for flue gas temperatures of up to 300 °C.

Oxystem 500/Wall Mounting

Similar to Oxystem 300/Compact, but with electronics in wall mounting housing. Control electronics and zirconium dioxide probe are connected by a special 2 m long cable.

Flue gas temperature up to 450 °C.

Technical specifications

Measuring range

0.3/24.6 % O₂ by volume, corresponding to: 0.12 V to 10 V

Accuracy of measurement

±0.1 % O₂ by vol.

Operating temperature range

Medium: Type 300 max. 300 °C

Type 500 max. 450 °C

Ambient: 0/+50 °C

Sensor operating temperature

700 °C

Probe pipe (V2A)

Ø 25 mm, L = 380 mm

Supply voltage

One of the following:

AC 230 V, 10 VA

AC 110 V, 10 VA

Warming up time

5 minutes

Analogue output

0-10 V

Housing

Type 300:

Impact resistant plastic (ABS)

W x H x D: 104 x 170 x 65 mm

Type 500:

Sheet steel, lacquered

W x H x D: 165 x 160 x 90 mm

Protection

IP 40 (EN 60529)

Weight

2 kg

DG: E	Part no.	Price €
Oxystem 300/Compact	69549	
Oxystem 300/Wall Mounting	69550	
Oxystem 500/Wall Mounting	69560	
Spare probe Oxystem 300/500, 300 mm long	69556	
Additional cost: probe extension by 150 mm	69538	
Additional cost: probe extension by 300 mm	69539	
Additional cost: probe extension by 450 mm	69540	

Oxygen analyser Oxystem 600



Evaluation unit



Probe



Application

Combustion monitoring and control in power plants and other heating systems. Suitable for continuous operation, even under arduous conditions.

Description

The sensor of the flue gas probe is based on the principle of solid electrolytes (zirconium dioxide). The free oxygen ion movement begins at temperatures of more 500 °C (solid electrolyte potentiometric method).

The sensor is heated. The oxygen concentration is calculated from the cell voltage and the temperature according to Nernst's law.

The analyser consists of a probe and an evaluation unit. The probe is directly immersed into the gas to be measured (in situ). The probe tip should be approximately in the centre of the chimney. The electronic system is equipped with a cable (5 m) with plug which is plugged directly into the probe. The evaluation unit is operated by means of the keypad and the display. The system displays the current oxygen concentration in percent by volume (0-21 % O₂) and the temperature of the measuring cell.

3 relay outputs (2 x limit control, 1 x alarm) as well as 1 analogue output are available. The system can be set to automatic calibration.

Technical specifications

Probe

Operating temperature range

Medium: +150/+680 °C

Ambient: -15 / +80 °C

Permissible reference throughput

0.5 - 10 l/h

Permissible gas speed

< 10 m/s

Supply voltage

AC 42 V

Power consumption

160 VA

Dimensions (Ø x L)

51 x (250/400/800/1,300/1,800) mm

Protection

IP 55 (EN 60529)

Weight

4/6.5/8/10.5/12 kg, depending on selected probe length

Evaluation unit

Operating temperature range

Ambient: +5/+50 °C

Display

4-line alphanumerical LCD display (temperature, oxygen concentration % by vol.). Range can be selected as required between 21 % by volume and 1 % by volume O₂.

Operation via keypad and menus.

Supply voltage

AC 110-230 V, 50-60 Hz

Power consumption

20 VA

Analogue output

0-20 mA or 4-20 mA (selectable)

Relay outputs

Relay contacts: 3 voltage-free changeover contacts

Contact rating: 0.5 A

Housing (with connection box)

W x H x D: 310 x 270 x 220 mm

Protection

IP 55 (EN 60529)

Weight

4.5 kg

CE conformity (EMC)

EN 50081-2 and EN 50082-2

Power supply unit

Operating temperature range

Ambient: -15/+50 °C

Supply voltage

AC 110-230 V, 50-60 Hz

Power consumption

160 VA (continuous operation)

Dimensions

W x H x D: 260 x 180 x 130 mm

Protection

IP 55 (EN 60529)

Weight

7.5 kg

CE conformity (EMC)

EN 50081-2 and 50082-2

DG: E	Part no.	Price €
Probe 250 mm	69447	
Probe 400 mm	69448	
Probe 800 mm	69449	
Probe 1,300 mm	69450	
Probe 1,800 mm	69451	
Evaluation unit	69453	
2 limit control contacts	69454	
Wall duct	69455	
Sep. power supply unit for T > 45 °C	69457	

Oxygen analyser Oxystem 1800

High temperature version



Evaluation unit



Probe



Features:

- In situ measurement directly in the gas duct
- Fast response
- No gas treatment required
- Easy to operate

Application

Combustion control and control of the furnace atmosphere at high temperatures in furnaces used in the ceramics and aluminium manufacturing industries. Measurements taken directly in the gas with short response times.

Description

The sensor of the probe is based on the principle of solid electrolytes (zirconium dioxide). The free oxygen ion movement begins at temperatures of more 500 °C (solid electrolyte potentiometric method). The probe is heated by the gas atmosphere, it does not have its own heating. The oxygen concentration is calculated from the cell voltage and the temperature according to Nernst's law.

The analyser consists of two components, the probe and the evaluation unit. The probe is mounted either horizontally or vertically (at temperatures of more than 1,200 °C). The evaluation unit and the probe are connected by a 2-core screened cable and a screened thermo compensation wire, type S (Pt/PtRh10). The maximum length is 20 m.

Operation via keypad and display. The display shows the current oxygen concentration in percent or ppm and the temperature of the measuring cell. The ranges automatically switch from % by vol. to ppm and to e xx % by vol. O₂.

Technical specifications

Probe

Operating temperature range

Medium: +700/+1,450 °C
Ambient: -15/ +70 °C

Permissible reference throughput

Not required, in special cases
0.5 to 5 l/h

Supply voltage

AC 42 V

Power consumption

160 VA

Dimensions (Ø x L)

25 x 600 mm,
other lengths on request

Protection

IP 55 (EN 60529)

Weight

2.5 kg

Evaluation unit

Operating temperature range

Ambient: 5/50 °C

Display

4-line alphanumeric LCD display (temperature, oxygen concentration % by vol.). Range can be selected as required between 21 % by volume and 0.1 ppm O₂. Operation via keypad and menus.

Supply voltage

AC 110-230 V, 50-60 Hz

Power consumption

20 VA continuous operation

Analogue output

0-20 mA or 4-20 mA (selectable)

Relay outputs

Relay contacts: 3 voltage-free
changeover contacts

Contact rating: 0.5 A

Housing (with connection box)

W x H x D: 310 x 270 x 220 mm

Protection

IP 55 (EN 60529)

Weight

4.5 kg

CE conformity (EMC)

EN 50081-2 and 50082-2

DG: E	Part no.	Price €
Meas. probe 600 mm	69562	
Extension to 1 m	69563	
Evaluation unit	69564	
2 limit control contacts	69454	
Wall duct	69455	
Thermal compensation wire	69565	
2-core measuring cable	69566	

Oxygen trace analyser Oxystem S



Oxystem S



Features:

- Oxygen analyser with largest range possible 100 % by volume to 10-25 % by volume O₂ (oxidising and reducing atmospheres)
- Completely self-monitoring
- Maintenance-free
- Fully automatic operation

Application

Monitors inert gas atmospheres for absence of oxygen in order to prevent oxidation. Measurement of residual oxygen concentration in the production of noble gases and nitrogen.

Oxygen measurement without cooling (hot measurement); the system can process gas directly at temperatures of up to 350 °C.

Description

The sensor is based on the principle of solid electrolytes (zirconium dioxide). The free oxygen ion movement begins at temperatures of more 500 °C (solid electrolyte potentiometric method).

The sensor is heated.

The oxygen concentration is calculated from the cell voltage and the temperature according to Nernst's law. The analyser is designed as a 19" rack mounting unit 3 HU, 84 DU. All components are integrated in a single housing.

The electronic system is operated via keypad and display.

The ranges % by volume, ppm and e xx % by volume O₂ are fully automatically switched over on the display. The menu item „Error status“ provides more detailed information on the self-monitoring functions. All status and alarm messages are indicated on the front (display with blinking exclamation marks) and output via a voltage-free changeover contact.

Technical specifications

Operating temperature range

Medium: 5/350 °C
 Ambient: 5/ 45 °C

Display

4-line, alphanumerical LCD display (temperature, oxygen concentration % by vol./ppm). Range can be selected as required between 100 % by volume and 0.1 ppm O₂. Operation via keypad and menus.

Permissible reference throughput

2 - 10 l/h

Gas input/output

6 mm Swagelok/
 4 mm capillary tube connection

Supply voltage

AC 230 V, 50-60 Hz

Power consumption

40 VA

Analogue output

0-20 mA or 4-20 mA (selectable)

Relay outputs

Relay contacts: 3 voltage-free changeover contacts
 Contact rating: 0.5 A

Housing

19" rack mounting, 3 HU
 W x H x D: 470 x 134 x 315 mm

Protection

IP 10 (EN 60529)

Weight

10 kg

CE conformity (EMC)

EN 50081-2 and 50082-2

DG: E	Part no.	Price €
Oxystem S	69551	
Flow meter with needle valve	69552	
Integrated gas pump	69553	
2 limit control relays	69454	
Output 6 mm Swagelok	69554	

Dust concentration measurement system S303/S305



S303



S305



Application

Compact dust concentration probe for stationary installation and qualitative/quantitative determination of dust emissions in all industries with dry flue gases. The system consists of the triboelectric measuring rod and the electronic unit for process and emission measurement for use in power plants combustion systems and for filter monitoring.

Description

The dust concentration measurement system is based on the triboelectric measuring principle. The dust concentration measurement system consists of an insulated probe which is installed in the gas pipe. The complete electronic system is integrated in the probe head so that no additional evaluation unit is required. The units are equipped with a microprocessor, two alarm relays, a 4-20 mA signal output and a serial RS422/485 port. The standard model is designed for applications with a max. pressure of 2 bar and a max. temperature of 300 °C. The proven and reliable triboelectric method is used for measurement. Particles come into contact with conducting surfaces, they are charged and then there is a charge transfer between the particles and the sensor. This small charge supplies the signal which is evaluated by the electronics.

Technical specifications

Measuring principle

Triboelectric sensor

Measuring range

0.1-1,000 mg/m³

Range adjustment

Automatic, based on the dust flow during set-up (or user-defined)

Offset trim

Automatic

Operating temperature range

Medium: max. 300 °C
Ambient: -20 °C/+45 °C

Permissible gas speed

> approx. 4 m/s

Probe

Stainless steel probe rod
Complete electronics in the probe head (no extra instrument)
Probe length 500 mm

Calibration

By gravimetric reference measurement

Dew point difference

Min. +5K

Supply voltage

AC 115 V, AC 230 V, DC 24 V

Analogue output

4-20 mA

Features of S305 with TÜV approval:

- Automatic range adjustment
- Automatic drift compensation
- Calibration for mg/m³ possible
- Remote adjustment and data transfer via RS422
- Self zero check and self span check
- Compensation for changing gas speeds
- PIN code lock

Relay outputs

Relay contacts: 2 voltage-free
changeover contacts
Contact rating: 5 A

Options

- Alarm level relay, pre-set or user-defined
- Software alarm adjustable via Dust Data Logging Software
- Probe length 250, 500, 750, 1,000 mm

Restrictions

Only limited suitability for measurement after electric filters. Only for measurement above the dew point of water. The probe can only be used at gas speeds of at least 4 m/s. The speed variation in the range from 4 to 12 m/s must not exceed 10 percent. The speed variation in the range from 12 to 18 m/s must not exceed 20 percent.

DG: E	Part no.	Price €
S305 Probe 500 mm with TÜV approval: 13th, 17th, 27th, 30th BlmSchV and TA Luft	69103	
S303 Probe 500 mm without approval, for quantitative measurement, with manual range adjustment	69099	

Volume flow measurement unit

VMG 02



Digital display unit (option)



Features:

- Compact design
- 2 analogue outputs
- RS 232/485 port
- Modbus protocol
- With PC software for further data processing

Application

The volume flow measuring unit is an in situ measuring system for the continuous measurement of the flue gas speed/volume flow, the pressure and the temperature in flue gas ducts and pipes. For continuous emission measurement, the system can also display the amount of pollutants (mass flow kg/h) as well as the volume flow in operating and standard norm state.

Description

The gas is measured with the dynamic pressure probe in the flow gas volume flow. The differential pressure is detected on a continuous basis. The differential pressure at a dynamic pressure probe indicates the speed of the flue gas. The volume flow in the flue gas can be determined with reference to the cross section of the flue gas duct. A serial RS232 or RS485 connection and the PC software ensures simple set-up of the probe as well as data transfer and further processing.

Two alarm relays and two analogue outputs 4-20 mA are provided. Relay 1 signals System OK and relay 2 is a programmable alarm level linked to the analogue output 1. The probe is connected by a signal cable. The unit requires a low DC supply voltage between 8 and 30 V.

Technical specifications

Measuring principle

Differential pressure

Measuring range

Differential pressure 0/10 mbar

Operating temperature range

Medium: max. 600 °C
 Ambient: -20 °C/+80 °C

Permissible gas speed

> approx. 4 m/s

Probe

Stainless steel probe rod
 Dynamic pressure probe with integrated temperature probe

Probe length

300 mm

Dew point difference

Min. +5K

Supply voltage

DC 8-30 V, 150 mA

Analogue outputs

2 x 4-20 mA

Relay outputs

Relay contacts: 2 voltage-free
 changeover contacts
 Contact rating: 1 A

Housing

Complete electronics in the probe head (no extra instrument)
 Sheet steel, lacquered
 W x H x D: 140 x 140 x 70 mm

Protection

IP 65 (EN 60529)

Options

- Probe length 400-2,000 mm
- Backwashing
- Digital display units

DG: E	Part no.	Price €
VMG 02 300 mm	68930	

Compact gas analysis unit EasySystem



Gas analysis unit EasySystem

System for continuous measurement. Measures the concentrations of one or two different gas components selectively and displays them. The basic EasySystem consists of an analyser module (infrared, paramagnetic, heat conductivity) contained in a wall mounting housing. In addition, the basic version features a gas pump, a flow meter and a gas filter on the front. This basic version is already an autonomous system for simple applications.

Numerous options are available to extend this basic EasySystem to cater for more complex applications:

- Gas cooler with automatic condensate removal
- External gas filter
- Condensate and flow monitoring
- Temperature control for heated line and monitoring of the gas sampling probe
- Test gas valve

All options can be integrated into EasySystem as required.

Features:

- Proven measurement technology
 - NDIR infrared gas analyser
 - Paramagnetic oxygen analyser
 - Heat conductivity gas analyser for binary gas mixtures
- Easy operation with just 4 buttons
- Comprehensive self-diagnostic functions and error messages
- Simplified calibration without test gas
- Extended output and control functions via RS 232-/RS 485 interface and modbus protocol

Numerous application possibilities

- Biofermenters
- Combustion processes
- Room air monitoring
- Silo monitoring
- Metal treatment plants
- Sewage plants
- Air fractionation
- Industrial gas filling
- Landfill gas monitoring
- O₂ purity measurements

Technical specifications

Infrared gas analyser

- NDIR measuring principle
- Selectively measures the concentration of one or two gas components
- Calibration without test gas with calibration cell (option)
- Available gas components: CO, CO₂, SO₂, CH₄, NO and electrochemical O₂ measurement (0/25 % by volume)
- Measured components and minimum ranges:
 - CO 0/100 ppm
 - CO₂ 0/50 ppm
 - CH₄ 0/200 ppm
 - SO₂ 0/200 ppm
 - NO 0/500 ppm
 - O₂ 0/2 % by volume

Please enquire for other components and ranges.

Oxygen analyser

- Paramagnetic oxygen analyser with thermostat on the basis of the magnetomechanical measuring principle
- Smallest measuring range: 0/2 O₂ by volume
Suppressed measuring ranges, smallest span: 2 % O₂ by volume
- Heat conductivity gas analyser
- Si heat conductivity sensor for measurement of binary mixtures
- 26 gas components are stored in the unit and pre-calibrated.

Housing/dimensions

Analyser housing

Sheet steel housing with front door and window

Dimensions (W x H x D)

535 x 610 x 225 mm (with terminal box and gas cooler)

Protection (EN 60529) (housing closed)

IP 65

Protection (housing door open)

IP 20

Protection (gas cooler)

IP 65

Terminal box

Cable glands

5 x PG13.5/2 x PG21

Housing colour

RAL 7035, RAL 7012

Gas analysis with EasySystem

DG: E	PU	Part no.	Price €
EasySystem CO in wall mounting housing Basic unit but with one IR component, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69070	
EasySystem NO in wall mounting housing Basic unit as above	1	69071	
EasySystem CH₄ in wall mounting housing Basic unit as above	1	69072	
EasySystem SO₂ in wall mounting housing Basic unit as above	1	69073	
EasySystem CO₂ in wall mounting housing Basic unit as above	1	69074	
EasySystem O₂ in wall mounting housing Basic unit but with paramagnetic measuring cell for measuring oxygen, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69075	
EasySystem O₂/CO in wall mounting housing Basic unit but with one IR component and oxygen measurement with electrochemical cell, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69076	
EasySystem O₂/NO in wall mounting housing Basic unit as above	1	69077	
EasySystem O₂/CH₄ in wall mounting housing Basic unit as above	1	69078	
EasySystem O₂/SO₂ in wall mounting housing Basic unit as above	1	69079	
EasySystem O₂/CO₂ in wall mounting housing Basic unit as above	1	69080	
EasySystem CO/CO₂ in wall mounting housing Basic unit but with two IR components, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69081	
EasySystem CO/NO in wall mounting housing Basic unit but with two IR components, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69082	
EasySystem CO/SO₂ in wall mounting housing Basic unit but with two IR components, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69083	
EasySystem CO/CH₄ in wall mounting housing Basic unit but with two IR components, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69084	
EasySystem CO₂/CH₄ in wall mounting housing Basic unit but with two IR components, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69085	
EasySystem H₂- in wall mounting housing Basic unit but for H ₂ measurement, consisting of: wall mounting housing, dust filter, rotameter, gas pump	1	69086	
Additional cost:			
Stainless steel piping	1	69087	
Automatic calibration	1	69088	
Gas cooler with hose pump	1	69089	
Flow monitoring, condensate monitoring	1	69090	
External gas filter	1	69091	
Temperature controller, heating tube and monitoring, heated probe	1	69092	
3/2-way solenoid valve	1	69093	

Gas analysis system BIOLYZER for discontinuous measurement



Application

The BIOLYZER gas analyser was specially designed for discontinuous analysis and regular process monitoring of biogenous process gases such as biogas, sewage gas and landfill gas. All important gas types such as methane, hydrogen sulphide, oxygen and carbon dioxide can be monitored.

Description

Complete measuring system for discontinuous, selective measurement and indication of up to four different gas components CH₄, H₂S, O₂ and CO₂. CH₄ and CO₂ are detected by means of infrared technology, O₂ and H₂S by means of electrochemical sensors. All components are integrated in a robust housing for wall mounting. The system features a 4-digit LED display and status indicators for each measurement channel as well as a 4-line, back lit LCD display. The memory has a history function, all values can be displayed. Output 4-20 mA, fully adjustable alarm level switches and binary outputs for: Active, Error, Calibration, Alarm.

A gas treatment unit with all important components (gas cooler, hose pump, fine filter, aerosol filter, rotameter with needle valve, anti-detonation device) is integrated in a robust, air-flushed housing. The system is supplied complete with wiring, capillary tubes, calibration and ready for installation.

Technical specifications

Gas types/measuring ranges

CH ₄	0/100 % by vol. IR double beam
CO ₂	0/100 % by vol. IR double beam
O ₂	0/25 % by vol. electrochemical
H ₂ S	0/5,000 ppm electrochemical

DG: E	Part no.	Price €
BIOLYZER for CH ₄ , H ₂ S, O ₂ and CO ₂	69643	
BIOLYZER for CH ₄ , H ₂ S and O ₂	69644	
BIOLYZER for CH ₄ and H ₂ S	69645	
BIOLYZER LT for CH ₄ , H ₂ S, O ₂ and CO ₂	69646	
BIOLYZER LT for CH ₄ , H ₂ S and O ₂	69647	
BIOLYZER LT for CH ₄ and H ₂ S	69648	

Measuring intervals can be programmed for all individual gas types. Manual measurement is possible at all times.

Gas treatment

With anti-detonation device, protective filters, two pumps, two rotameters, needle valves, gas cooler with condensate trap and hose pump.

Display

4-digit LED display, status indicators for each channel, 4-line back lit LCD display, memory with history functions, all values can be displayed.

Communication

RS 232, analogue output per gas type, output 4-20 mA, linearised, data memory/history

Operating temperature range

Ambient: 5/40 °C

Supply voltage

AC 85-264 V, 47-63 Hz

Dimensions

W x H x D:
approx. 300 x 400 x 165 mm

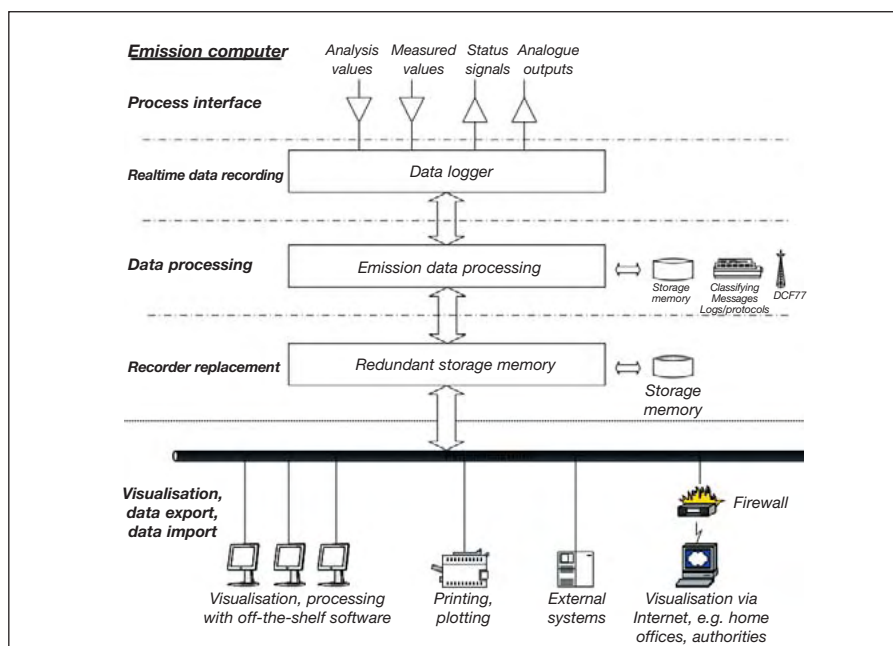
BIOLYZER LT

BIOLYZER LT is intended for simple and cost-effective routine checks. It is a BIOLYZER version, but it does not feature a gas cooler. Neither does it have the load limitation for hydrogen sulphide measurement. Therefore, the standard measuring range is 0 to 1,000 ppm H₂S.

Options

- Profibus
- 2nd measuring point

Emission computer



Application

Newly designed emission and data recording system with state-of-the-art hardware and software. This system meets all requirements according to DIN EN 14181 regarding emission computers in Germany (TA Luft, 13th, 17th, 27th and 30th BImSchV, Standard Harmonised Practice Concerning Emission Computers, letter of Ministry of August 2, 2004).

Description

The entire processing logic is based on single second cycles, i.e. all data is recorded and calculated (e.g. standardisation) and visualised in cycles of one second. This is considerably faster than the legal minimum requirement of 5 seconds. There are no restrictions in terms of channel numbers of analogue and digital recording in real life applications of the system. The software is Java-based, so that it is platform-independent. This means that the software can run on different hardware platforms and under different operating systems without requiring modifications. This is of considerable advantage in the long term.

If required, it is no problem to switch to other hardware suppliers or operating systems at a later date. Due to the redundant storage of data, it is not necessary to run an additional recorder for emission measurement, as stipulated by the authorities. In addition, the legal obligation to generate automatic print-outs such as classification logs and messages does not apply. Operator guidance and user interface conform to current standards. The **data logger** takes over the actual recording of the measured data and the output of analogue and digital signals in realtime.

The data logger records the following value in cycles of a single second:

- Analogue input signals
- Digital input signals
- Analogue output signals
- Digital output signals

Data recording is so fast that it exceeds the legal requirements by far. Choice of measuring accuracy: 12 or 16 bits. For practical use, there are no limitations in terms of measurement channels.

Modular process data recording system for continuous emission monitoring according to all relevant regulations and directives:

- TA Luft
- 13th - 17th - 27th - and 30th BImSchV
- Standard Harmonised Practice Concerning Emission Computers (German Ministry letter, August 2, 2004)
- DIN EN 14181

In addition to emission data, the system can also record, process and visualise operational data.

If a single data logger is not sufficient for the task at hand, additional data loggers can be added as required.

A separate computer is responsible for data processing. The values measured by the data logger are stored every second. This is the basis for all further data processing. The values (in intervals of a second) are computed into integrated values which, in turn, serve as the basis for classifying according to the various legal requirements. The emission computer meets the following requirements:

- Storage of values recorded in single-second cycles
- Calculation of derived values in single-second cycles
- Computation and storage of integrated values
- Computation and storage of classification data
- Generation of messages
- Generation of digital output and analogue output signals
- Time synchronisation according to DCF77

Prices on request.

Chapter 14

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Signal isolation/signal amplification

TV 22 GL



Description

The TV 22 GL isolating amplifier is used for the galvanic isolation and amplification of DC current signals (mA). Input and output are galvanically isolated with a high level of isolation. The integrated electronic high efficiency power supply unit prevents overheating and allows for high output loads. The extremely narrow design allows for space saving installation.

Technical specifications

Housing

Standard DIN-rail housing
W x H x D: 18 x 78 x 103 mm

Supply voltage

AC/DC 20-253 V

Input

0-20 mA or 4-20 mA

Output

0-20 mA or 4-20 mA
1:1 proportional to input signal

Output load

Max. 400 Ohm

TV 200 GS



Description

The TV 200 GS isolating amplifier is used for galvanic isolation, conversion and amplification of standard output signals (V/mA). Input and output are galvanically isolated with a high level of isolation. The integrated high efficiency electronic power supply unit prevents overheating and allows for high output loads. Offset and gain can be adjusted by two potentiometers on the unit front.

Technical specifications

Housing

Standard DIN-rail housing
W x H x D: 23 x 78 x 103 mm

Supply voltage

DC 20-30 V or AC 230 V

Input

4-20 mA or 0-10 V

Output

0-10 V or 4-20 mA

Output load

I max. 900 Ohm/U min. 500 Ohm

STV 22 GL



Description

The STV 22 GL isolating amplifier with supply is used for the galvanic isolation and amplification of DC current signals (mA). The connected transducer is directly supplied via a galvanically isolated and limited supply voltage. Input and output are galvanically isolated with a high level of isolation. The integrated high efficiency electronic power supply unit prevents overheating and allows for high output loads.

Technical specifications

Housing

Standard DIN-rail housing
W x H x D: 18 x 78 x 103 mm

Supply voltage

AC/DC 20-253 V

Sensor supply

DC 27 V open circuit voltage
DC 21 V at 20 mA

Input

0-20 mA or 4-20 mA

Output

0-20 mA or 4-20 mA
1:1 proportional to input signal

Output load

Max. 800 Ohm

DG: H	Part no.	Price €
TV 22 GL	53701	
TW 41 GM (isolator without power supply)	53702	
TWH 41 GM (HART-enabled)	53703	

DG: H	Part no.	Price €
TV 200 GS Input 4/20 mA Output 0/10 V	53704	
TV 200 GS Input 0/10 V Output 4/20 mA	53705	
other signals		on request

DG: H	Part no.	Price €
STV 22 GL	53706	
STH 22 GL (HART-enabled))	53707	

Trip amplifier, selector switch, Zener barrier

MK 330 GS



Description

The MK 330 GS trip amplifier compares the measurement signal at the input with the pre-set values of the coding switches (0-99 %). If the measurement signal exceeds or falls below the setpoint, the corresponding output relay responds according to the selected fail-safe function (relay energises or de-energises). The SMK 330 GS trip amplifier with integrated power supply also supplies the connected transducer.

Technical specifications

Housing

Standard DIN-rail housing
 W x H x D: 23 x 78 x 103 mm

Supply voltage

MK 330 GS: AC/DC 20-253 V
 SMK 330 GS: DC 20-30 V or
 AC 230 V

Input

0-10 V or (0)4-20 mA

Input resistance

1 50 Ohm/U 400 kOhm

Output

2 relays changeover contacts
 250 V, 2 A, 100 VA
 Function 2Max, 2Min or 1Max/Min

DG: H	Part no.	Price €
MK 330 GS	53708	
SMK 330 GS Transducer supply DC 24 V	53709	

MSU 12



Description

The MSU 6 and MSU 12 selectors are designed for manual operation. They allow up to 6 3-wire or 4-wire transducers (MSU 6) or up to 12 2-wire transducers to be connected to a common display unit (or recorder).

Technical specifications

Housing

Standard rack housing
 W x H x D: 96 x 48 x 134 mm

Panel cut out

W x H: 92 x 45 mm

Protection (front)

IP 40 (EN 60529)

Mechanical service life

>25,000 switching cycles

Input

Voltage < 42 V, current < 2 A

Switch rating (resistive load)

at 1 V/1.5 A (AC/DC)
 at 42 V/0.2 A (AC/DC)

DG: H	Part no.	Price €
MSU 6 6 Inputs 3- or 4-wire	53710	
MSU 12 12 Inputs 2-wire	53711	

GHG 111



Description

The GHG 111 Ex safety barrier is designed for intrinsically safe monitoring of measuring currents in Ex zone 1. For connection to display instruments (0)4-20 mA and to Ex-approved sensors EEx ib/ia II B / II C.

Technical specifications

Housing

Standard DIN-rail housing with
 plug-in base
 W x H x D: 11 x 125 x 85 mm

EC design type approval:

TÜV 99 ATEX 1449x
 II (1) G [EEx ia] II C

Input

(0)4-20 mA

Output

(0)4-20 mA intrinsically safe (i a)

Current circuits (max. data)

U. 28/28 V
 I. 93/100 mA
 P. 651/40 mW
 La 2.1/4 mH
 Ca 83/83 nF

Ambient temperature

Max. 60 °C

DG: H	Part no.	Price €
GHG 111	31284	

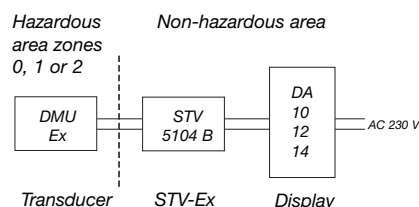
Ex isolating amplifier with power supply STV 5104 B

STV 5104 B



- 1- or 2-channel version
- 2-wire supply
- > 18 V in hazardous area
- 20 programmable measuring ranges
- Universal AC or DC supply

Connection diagram



Description

STV 5104 B is used to supply, galvanically isolate and amplify 2-wire and 3-wire transducers in hazardous areas. Input and output are galvanically isolated with a high level of isolation.

Technical specifications

Housing

Standard DIN-rail housing
W x H x D: 23.5 x 109 x 130 mm

Protection

Housing IP 50 (EN 60529)
Terminal IP 20 (EN 60529)

Supply voltage

AC/DC 24-230 V

Power consumption

≤ 3 W

Transducer supply

DC 18-28 V
(> 18 V at 20 mA)

Input

0(4)-20 mA (min. 16 mA)
0-10 V (min. 8 V)

Output

0(4)-20 mA (min. 16 mA)
0-10 V (min. 8 V)
Configurable as required

Accuracy of measurement

≤ 0.1 % FS

Temperature coefficient

≤ 0.01 % FS/°C

Response time

< 25 ms

Operating temperature range

Ambient: -20 °C/+60 °C

Calibration temperature

20-28 °C

Ex data

U_m ≤ 250 V
 U_0 28 V DC
 I_0 93 mA DC
 P_0 ≤ 0.65 W
 L_0 ≤ 3 mH
 C_0 ≤ 0.08 μF

Ex approvals

CENELEC [EEEx ia] II C
ATEX II (1) G
Applicable to zones 0, 1 or 2

Compliance with official directives/norms

EMC 89/336/EEC
Emission EN 50 081-1
EN 50 081-2
Immunity EN 50 082-2
EN 50 082-1

LVD 73/23/EEC
EN 61 010-1
PELV/SELV IEC 364-4-41
and EN 60 742
ATEX 94/9/EG EN 50 014
and EN 50 020

DG: H

Version	Part no.	Price €
STV 5104 B 1 channel	53720	
STV 5104 B 2 channels	53721	

Multifunctional transducer MFU

MFU 01



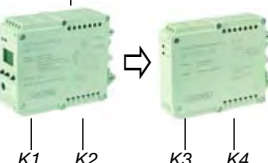
- Easy operation
- Scalable as required
- Programming interface
- Extendable
- Universal input
- Integrated supply voltage for transducer
- 2 analogue outputs
- Linearisation 16 x-y points

Application



- mA
- Transmitter
- V
- Pt100/Pt1000

0..4...20 mA
0..2...10 V



Description

Universally programmable, multi-functional transducer for current, voltage, resistance transmitters (Pt 100 and others), potentiometer. 2 linear analogue outputs (1 x (0)4-20 mA, 1 x (0)2-10 V) galvanically isolated from the input. 2 fully programmable, voltage-free limit switches (can be extended to 4). Interface for configuration via PC. Three-colour, two-line LCD for direct indication of the operating state.

Universal power supply.

Technical specifications

Display

Two-line, 4-digit, 12 mm high, 3-colour LCD

Range

0 to 9999 digits (min. and max. values scalable as required)
Unit indication.

Accuracy of measurement

±0.3 % of FS

Resolution

Decimal point setting as required

Sensor input

2-wire transmitter (DC 24 V)

3-wire transmitter (DC 24 V)

Current max. 20 mA

Voltage max 10 V

Pt 100 2-,3- or 4-wire

(according to DIN IEC 751)

Pt 1000 (according to DIN IEC 751)

Analogue outputs

2 synchronous analogue outputs, scalable as required 0/100 %

Analogue output 1 (current)

(0)4-20 mA, fully configurable, galvanically isolated from input

Analogue output 2 (voltage)

(0)2-10 V, fully configurable, galvanically isolated from input

Relay outputs

2 x voltage-free changeover contacts, fully adjustable AC 250 V 2A 100 VA (a total of 4 voltage-free changeover contacts if contact extension module is used)

2 x open collector outputs, max. 30 V, 50 mA (earth switching) for contact extension module

Linearisation (via software)

Customer specific linearisation with a max. of 16 points for volume indication (e.g. litres) in non-linear tanks

Supply voltage

AC/DC 20-253 V

Housing

Standard DIN-rail housing

W x H x D: 33 x 78 x 103 mm

Accessories (optional)

• Contact extension module

Input: 3 control lines from MFU

Output: 2 changeover contacts

AC 250 V, 2 A, 100 VA

W x H x D: 23 x 78 x 103 mm

• Programming software

WIN 95/98/2000/XP

DG: H	Part no.	Price €
MFU 01 with display and keys	53712	
MFU 02 without display without keys	53713	
MFU-KEM Contact extension module	53714	
MFU-S Software and interface cable	53715	

Digital plug-in display DA 06



- Easy and quick mounting with plug-in system
- Indication fully scalable as required
- Housing and display can be rotated fully
- Integrated diagnostic system
- Open collector switching output/PNP
- Optional Ex protection
- Protection IP 65



Application

Cost-effective digital display unit for local indication on all transducers with 4-20 mA output and DIN 43650-A plug. Easy and quick mounting via plug-in system. Optional Ex protection (zones 0/1).

Description

DA 06 is mounted between the plug and the junction box and is immediately ready for operation. As the unit is supplied via the 4-20 mA loop, it does not require a separate power supply. The unit is programmed via two keys on the front. The following parameters can be set:

scaling, decimal point, dampening, switch point and time delay.

In addition, the unit features a memory for min. and max. values. The settings are not lost in the event of a power failure.

Out of range values (min. or max.) can be displayed as messages.

The integrated diagnostics system continuously monitors all functions of the display.

The housing can be turned by 300°, the display by 330°.

Technical specifications

Measuring range

-1.999/+9.999 digits (min. and max. values scalable as required)

Display

4-digit, 7 mm high, red LED display
Display housing can be turned by 330°

Accuracy of measurement

0.1 % $\pm$ 1 digit

Adjustable parameters

Scaling, decimal point, dampening, switch point

Min./max. value memory

Allows to display the minimum and maximum values recorded during operation.

Housing

Plastic PA 6.6/polycarbonate
W x H x D: 47 x 47 x 68 mm
Housing can be turned by 300°

Protection

IP 65 (EN 60529)

Operating temperature range

Ambient/
Electronics: -25 °C/+85 °C
Storage: -40 °C/+85 °C

Electrical connection

Adapter for plug to DIN 43650-A

Input signal

4-20 mA, 2-wire

Switching output

1 open collector (PNP), max. 125 mA (with Ex approval max. 70 mA, 4.7 mH)

On/off delay timer: 0/100 s

Temperature influence: 0.1 %/10 K

CE conformity

EN 61326

Options

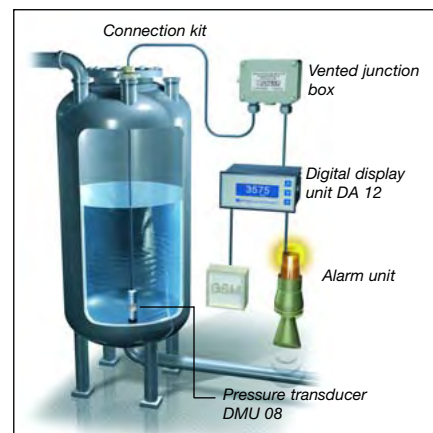
- Ex protection
II (1) 2 G EEx ia IIC T4
- Other electrical connections

DG: H	Part no.	Price €
DA 06	31278	
DA 06-Ex	31279	

Digital display units DA 10/12/14



- 5-digit graphic LCD display
- Text-based user interface
- Linearisation for volume indication (24 points)
- Selectable units
- Universal power supply
- Integrated supply voltage for transducer
- Relay outputs (DA 12/14)



Description

Digital display unit (DA 10), also available with additional relay output (DA 12/14), for electronic transducers.

Technical specifications

Display

5-digit graphic LCD display, backlit (white), text-based user interface, user interface language selectable (German/English/French), selectable units of measurement.

Measuring range

±99.999 digits (min. and max. fully adjustable)

Linearity

±0.1 % of measuring range

Resolution

Decimal point setting as required

Response time

< 0.2 s

Operating temperature range

Ambient: -10 °C/+55 °C

Supply voltage

AC/DC 20-253 V

Sensor supply

Integrated, galvanically isolated power supply for transducer:
DC 20 V/20 mA

Sensor input

All analogue standard signals, e.g.
4-20 mA, 0-20 mA,
0-1 V, 0-10 V

Analogue output

0/4-20 mA, galvanically isolated

Housing

Standard rack housing
W x H x D: 96 x 48 x 135 mm

Panel cut out

W x H: 92 x 45 mm

Protection (front)

IP 65 (EN 60529)

Electrical connection

Screw terminals, plug-in
(1.5 mm²)

Linearisation

Customer-specific linearisation with a max. of 24 points for volume indication (e.g. litres) in non-linear tanks. Dip charts for cylindrical, vertical tanks and spherical tanks are pre-programmed.

Min./max. value memory

Allows to display the minimum and maximum values recorded during operation.

Additional functions DA 12

Analogue output 2

0-10 V, galvanically isolated

Relay outputs

Relay contacts: 2 voltage-free changeover contacts (adjustable hysteresis)
Contact rating: AC 250 V, 2 A, 100 VA

Additional function DA 14

Analogue output 2

0-10 V, galvanically isolated

Relay outputs

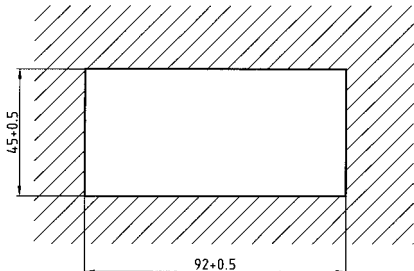
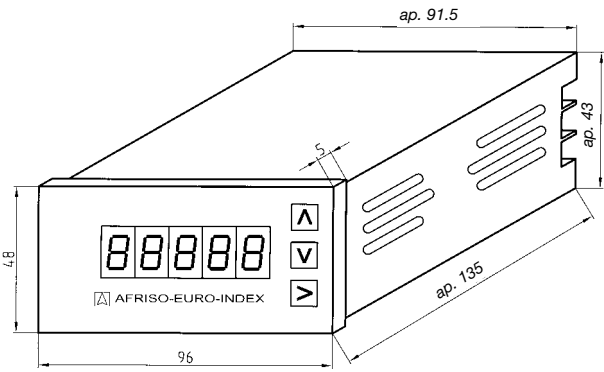
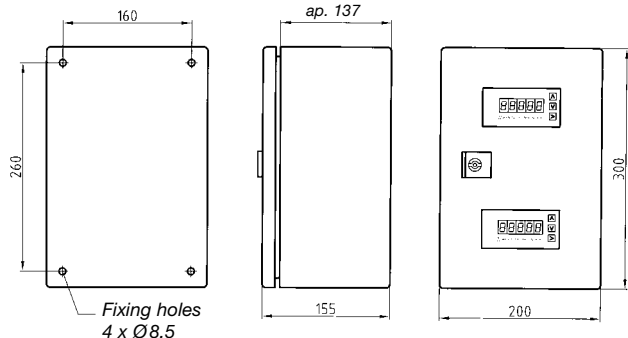
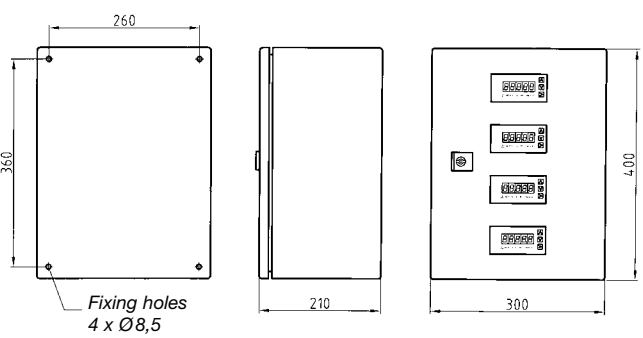
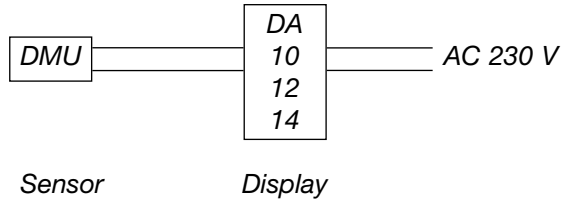
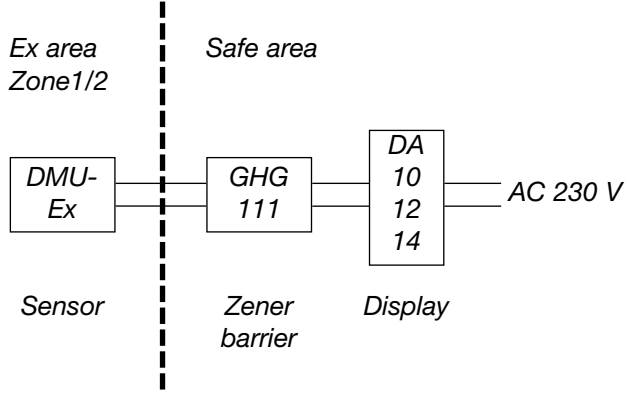
Relay contacts: 4 voltage-free changeover contacts (adjustable hysteresis)
Contact rating: AC 250 V, 2 A, 100 VA

DG: H	Part no.	Price €
DA 10	31281	
DA 12	31282	
DA 14	31283	
Wall mounting housing WAG 01 for mounting of one DA*	31287	
WAG 02 for mounting of two DA*	31288	
WAG 03 for mounting of three DA*	31289	
WAG 04 for mounting of four DA*	31290	

* Price includes mounting if DA and WAG are ordered together.

Digital display units DA 10/12/14

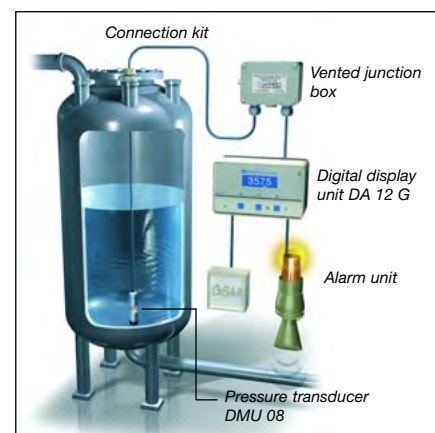
Dimensions (in mm) and connection diagrams

Panel cut out 	DA 10/12/14 
Wall mounting housing WAG 01/02 for up to 2 DA 10/12/14 	Wall mounting housing WAG 03/04 for up to 4 DA 10/12/14 
Connection diagram for standard application 	Connection diagram for Ex application 

Digital display and control unit DA 12 G in wall mounting housing



- Compact and ready to connect
- Easy installation and commissioning
- 5-digit graphic LCD display
- Text-based user interface
- Selectable measurement units
- Universal power supply
- Integrated power supply for transducer
- 2 switching relay outputs
- RS 485 interface



Description

Compact, ready-to-connect universal measuring and control unit in a robust wall mounting housing. With integrated sensor supply, 2 relay outputs and RS 485 interface. Together with a transducer (e.g. for pressure, temperature, level, etc.), DA 12 G forms an autonomous measurement and control system. DA 12 G can be configured as required and features an integrated interface for communication with computer based systems. In conjunction with a PC, an SSK485 interface converter (RS 485 to RS 232) and the PC Log1 software for Windows plus DA 12 G an extremely cost-effective solution for recording, data storage, long-term monitoring, large display is created.

Technical specifications

Display

5-digit graphic LCD display, backlit (white), text-based user interface. User interface language selectable (German/English/French), selectable measurement units.

Measuring range

± 99.999 digits (min. and max. values scalable)

Linearity

± 0.1 % of measuring range

Resolution

Decimal point setting as required

Response time

< 0.2 s

Operating temperature range

Ambient: -10 °C/+55 °C

Supply voltage

AC/DC 20-253 V

Sensor supply

Integrated, galvanically isolated power supply for transducer:
DC 20 V/20 mA

Sensor input

All analogue standard signals, e.g. 4-20 mA, 0-20 mA, 0-1 V, 0-10 V

Analogue output 1

0/4-20 mA, galvanically isolated

Analogue output 2

0-10 V, galvanically isolated

Relay outputs

Relay contacts: 2 voltage-free changeover contacts (adjustable hysteresis)
Contact rating: AC 250 V 2A 100 VA

Interface

RS 485 (addresses 00 to 15, i.e. can be networked with up to 16 devices)

Housing

Wall mounting housing made of impact resistant plastic (ABS)
W x H x D: 163 x 97 x 62 mm

Protection (EN 60529)

Front IP 65
Housing IP 30
(with cable gland IP 42)

Linearisation

Customer specific linearisation with a max. of 24 points for volume indication (e.g. litres) in non-linear tanks. Dip charts for cylindrical, vertical tanks and spherical tanks are pre-programmed.

Min./max. value memory

Allows to display the minimum and maximum values recorded during operation.

DG: H	Part no.	Price €
DA 12 G	31246	
Interface converter SSK 485 (RS 485 to RS 232), with power supply unit	31270	
Software PC Log1, 1 channel and 9 channels	31272	
PC-RS 232 adapter cable	31247	

Audible and visual alarms



Horn KH 1

Horn with continuous tone for use in dry areas.

Technical specifications

Sound level:
90 dB (A), distance 1 m
Supply voltage: AC 230 V
Power consumption: 6 VA
Protection: IP 20 (EN 60529)
Weight: 0.18 kg

Alarm light with horn

Combination alarm light and horn, can be controlled separately.

Technical specifications

Supply voltage: AC 230 V
Sound level:
90 dB (A), distance 1 m
Power consumption: 10 VA
Protection: IP 33 (EN 60529)
Weight: 0.19 kg

Horn HPW 2

Horn with continuous tone for use in humid areas and for outdoor installation.

Technical specifications

Sound level:
110 dB (A), distance 1 m
Supply voltage: AC 230 V
Power consumption: 22 VA
Protection: IP 55 (EN 60529)
Weight: 1 kg



Alarm light with rotating reflector

Alarm light with rotating reflector, with yellow light, for use in humid areas and for outdoor installation. Highly effective due to rotating reflector. Robust design with AI base. Maintenance-free, suitable for continuous operation. Any mounting position.

Technical specifications

Supply voltage: AC 230 V
Protection: IP 55 (EN 60529)
Weight: 1.8 kg



Alarm re-set unit AQ 220

The alarm re-set unit AQ 220 is designed for connection to leak detectors and level switches (e.g. RG 210, ELT 8). Visual and audible signals indicate alarms. The audible signal can be muted using the Re-set button. The visual signal remains on until the problem is remedied or the probe is no longer in contact with the medium (e.g. in case of leak alarm) or the probe is submerged again (e.g. in case of dry-run protection). As soon as the visual alarm is switched off, the system resumes „ready“ mode. In addition, external alarm units can be connected. (If external alarms are not connected via the AQ 220, there is a risk that they will unintentionally remain switched off).

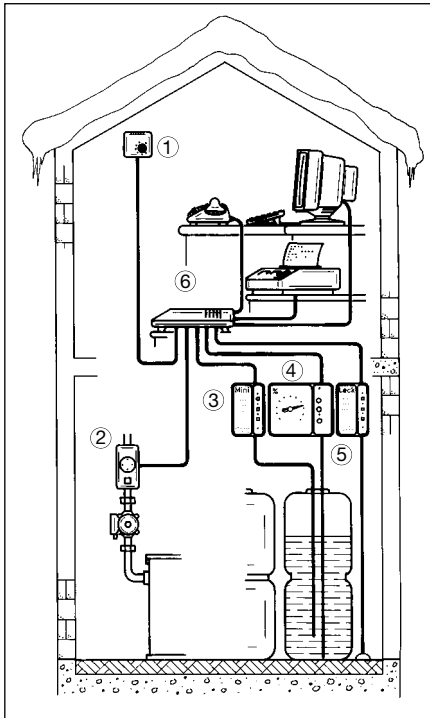
Technical specifications

Supply voltage: AC 230 V
Output: 2 voltage-free normally open contacts (horn, light)
Operating temperature range:
-5 °C / +50 °C
Dimensions W x H x D:
50 x 110 x 110 mm
Protection: IP 30 (EN 60529)

	PU	Part no.	DG	Price €
Horn KH 1	1	61011	G	
Alarm light with horn	1	61020	G	
Horn HPW 2	1	61012	G	
Alarm light with rotating reflector	1	61015	H	
Alarm re-set unit AQ 220	1	53230	E	

AFRISO event reporting systems

Remote reporting, alarm generation, logging, remote polling, remote switching



AFRISO event reporting systems monitor a site for dangerous events and report such events via the public telephone network or GSM by means of digital data or voice messages.

Monitoring functions:

- Events such as leaks, failure of the heating system, glass breakages, movements, burglary or robbery
- Events such as smoke, fire, gas or flooding
- Levels in tanks and containers
- Leaks in tanks or pipes
- Measured values such as temperature, level, pressure

We provide a complete range of signal transducers. Depending on the system configuration, the AFRISO event reporting systems allow for full remote supervision of the complete residential and technical installation.

Features:

1. Event reporting

The reporting system calls you by phone or GSM and reports the events.

2. Remote control

You can also call the event reporting system and send commands by phone to control lights, heating systems, air conditioning systems, shutters, blinds, etc.

3. Data logging

Event reporting systems log data at specific intervals.

4. Remote data polling

You can access the event reporting system via phone, GSM or Internet and receive current and stored data.

5. Remote programming

You can program various parameters by phone or GSM. For example, it is possible to remotely change the telephone number to which the system is to report the events.

6. Integrated security system

The event reporting systems integrate a whole range of security functions:

- Password protection ensures that unauthorised persons cannot access the system.
- If the number to be called by the system is busy, the system redials automatically.
- If the number is still busy after several attempts, the system calls the divert number.

- All program settings, voice messages and alarms not yet processed are saved in case of a power failure; the system resumes processing when power is restored.

Application example:

Sensors and alarm devices monitor all the functions of your heating system or even your complete house around the clock.

One or several temperature sensors (1) monitor endangered or critical rooms. One or more surface mounting thermostats (2) check whether the water is hot, the burner and boiler as well as the circulation pumps function properly. A minimum level alarm (3) or a remote tank level indicator (4) with reserve alarm indicate when you have to refuel. The remote indicator also allows for easy and regular level monitoring, e.g. in underground tanks or basement tanks which are not easily accessible.

We provide leak monitoring instruments (5) for all types of tanks and pipes.

Many other areas can be monitored with technology provided by AFRISO. The sensors and alarm devices activate the AFRISO event reporting system (6) and provide messages via fax, phone, GSM or Internet to a single address or several addresses. Depending on the system configuration, the individual problems can be treated as a single alarm or they can be differentiated. This allows the system to send different types of messages to different addresses. For example, a low oil message is sent to your oil supplier, a burner failure to your burner service people, etc.

AFRISO event reporting systems – overview



**Event reporting system
Phone Alarm SD1**



**Event reporting systems
EMS 220/EMS 442**



**Event reporting system
GSM Alarm**



**Fuel Oil Manager
INTERNET**

Event reporting system Phone Alarm SD1

- 4 digital inputs (voltage-free NC or NO contacts)
- Recipient of the message: phone or cell phone
- Type of message: voice message
A voice message can be assigned to each alarm input. The alarm is reported via a voice message recorded by the user.
- Re-set mode: the alarm remains active until it is re-set.

Event reporting systems EMS 220/EMS 442

Suitable for a large range of domestic and industrial applications. Up to 4 continuous measurements and 4 limit values can be monitored with one unit. In connection with the AFRISO Net Webservice, data can also be visualised, logged and managed.

Event reporting system GSM Alarm

- 4 digital inputs (voltage-free NC or NO contacts)
- Recipient of the message: cell phone, phone, fax, PC with modem
- Type of message: SMS via mobile network
An SMS text can be assigned to each of the 4 alarm inputs; this SMS can be sent to 2 different phone numbers. The SMS can be converted to a voice, e-mail or fax message by the service provider.
- SMS is sent if the status or an input changes
- SMS is sent at intervals (e.g. every 24 hours)
- GSM alarm can be remotely programmed via SMS at any time
- Manual status query

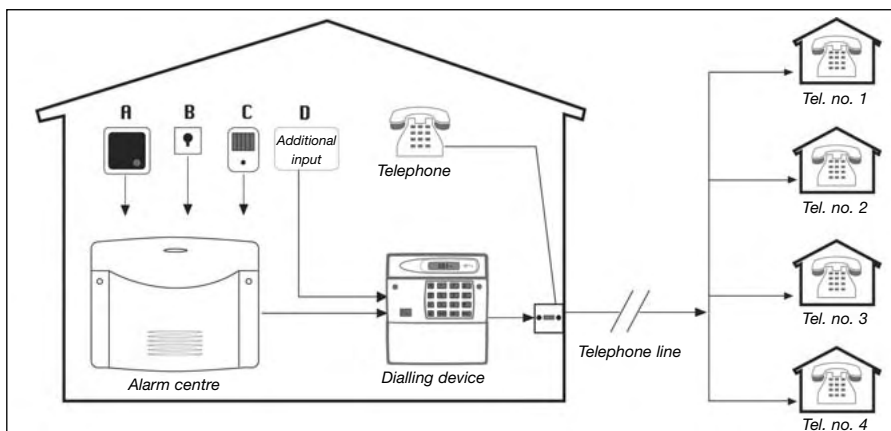
Event reporting system Fuel Oil Manager INTERNET

- Hydrostatic level measurement system for fuel oil EL, L or diesel
- Recipient of the message: Mareon Internet data centre.
The incoming data is presented in a detailed overview. This password protected overview can be accessed via the Internet.
- Type of message: When a defined low level is reached, an SMS or an e-mail message is sent to the customer.
- Automatic, regular updating of the measured data
- Analytic evaluation (planning and controlling)
- Internet service with annual fee

The event reporting system Fuel Oil Manager INTERNET allows you to manage tanks and delivers precise information on the actual tank contents.

Event reporting systems allow for remote monitoring of all AFRISO signal transducers.

Event reporting system Phone Alarm SD1



Event reporting system Phone Alarm SD1

The event reporting system Phone Alarm SD1 is used to automatically transmit alarms or messages on malfunctions via the public telephone network. In case of an alarm, up to 4 phone numbers (e.g. landline, cell phone and emergency centre) are dialled automatically, an identification text and then one of the 4 event messages are transmitted. The identification text and the event message can be recorded by the user. The total length of the messages is 40 seconds. The alarm remains active until it is re-set. Connection is very simple. Voltage-free NC or NO alarm contacts are connected to the inputs.

Together with a home security system or with the appropriate signal transducers, Phone Alarm SD1 is the perfect solution for home security systems (fire, gas, water) or for monitoring power failures, refrigerator or freezer problems or to signal levels (e.g. minimum level in the fuel oil tank). Phone Alarm SD1 can respond to 4 separate alarm inputs. Several sensors can be connected in series or in parallel and then be monitored by a single alarm input.

The unit features an LCD display. The dialling unit is programmed via menus and the LCD display.

The factory defaults ensure easy commissioning. However, the numerous configuration options allow the system to be adapted to individual requirements. Since Phone Alarm SD1 is only active in case of an alarm, it can be operated at a common subscriber line together with other equipment such as telephone, fax and answering machine. Phone Alarm SD1 does not influence these devices in any way.

Typical applications

- Malfunctions of technical installations such as refrigeration, heating, elevator, air conditioning can be communicated immediately and directly to the service partner.
- Alarms from security systems can be directly transmitted to security staff. They can then inform the police or the fire brigade.
- When home security systems or alarm contacts respond, the system reports this to relatives, neighbours, friends or the user's cell phone.
- Professional applications include status monitoring of vending machines.

Technical specifications

Supply voltage

DC 11.5-14 V

Current input

35 mA (standby), 70 mA (alarm)

Telephone connection

Analogue land line

Alarm inputs

4 digital inputs (voltage-free NC or NO contacts)

Voice messages

40 seconds $\pm$ 2 seconds

Telephone numbers

Up to 4 x 24 digit numbers can be dialled

Programming

Menus via LCD display

Special features

Programmable alarm repeat, remote re-set

Scope of delivery

Event reporting system Phone Alarm SD1 with integrated microphone and speaker, analogue phone connector, installation instructions

Dimensions W x H x D:

150 x 104 x 30 mm

DG: H, PU: 1	Part no.	Price €
Event reporting system Phone Alarm SD1	90003	
Power supply unit for AC 230 V	90010	

Event reporting system GSM Alarm



Event reporting system GSM Alarm

GSM Alarm is ideally suited for a whole range of remote monitoring tasks. When an alarm occurs, it sends SMS messages via the mobile network. GSM Alarm has four digital inputs. If the state of an input changes, the system sends an SMS. This can be received anywhere in the world. The service provider may be able to convert the SMS into a voice, e-mail or fax message. Various systems, devices and sensors can be connected to the inputs and monitored. A separate SMS text can be assigned to each input state (input open/closed); this SMS can be sent to two different phone numbers. GSM Alarm sends this message whenever the input state changes and, if required, at predetermined intervals, for instance every 24 hours. Users may also request a report on the state of the inputs. All GSM Alarm settings are made by SMS and can be changed at any time and from anywhere. GSM Alarm is supplied with an internal GSM antenna, a SIM card reader, a power supply unit and a user's guide.

Customised solutions are available if the standard version does not meet all requirements for a given application. This type of solution can be extended with digital and analogue inputs and outputs, an RS 232 interface, various battery options and software adaptations. GSM Alarm allows for remote monitoring of all signal transducers from the AFRISO product range.

Application areas

- **Mobile monitoring**
For remote monitoring of installations, devices and sensors if no land line is available.
- **Tank contents monitoring**
If the level falls below a pre-set value, an SMS is sent to the fuel oil supplier or owner.
- **Monitoring of heating systems**
If the heating fails or the temperature falls below or exceeds a given value, an SMS is sent.
- **Monitoring of home security alarm systems**
When an alarm occurs, messages are sent to the owner, to security services, the police, the fire brigade, etc.

• Monitoring of technical equipment and installations

In case of problems with air conditioning or heating systems, elevators etc., the service people are immediately notified via SMS.

Technical specifications

Supply voltage

AC 230 V, power supply unit

Supply voltage

DC 12-24 V

Power consumption

- **Standby mode**
Max. 8 mA at 12 V
- **Transmission mode**
Max. 120 mA at 12 V (GSM 900)

Alarm inputs

4 digital inputs (voltage-free NC or NO contacts)

Operating temperature range

Ambient: -20 °C/+55 °C
Storage: -30 °C/+85 °C

GSM specifications

EGSM 900 and GSM 1800

Housing

ABS, black
W x H x D: 110 x 56 x 26 mm

Protection

IP 40 (EN 60529)

Weight

Approx. 100 g (without external cables, without power supply unit)

DG: H, PU 1	Part no.	Price €
Event reporting system GSM Alarm (without SIM card)	90002	

Event reporting system Fuel Oil Manager INTERNET



Fuel Oil Manager INTERNET

The Fuel Oil Manager INTERNET allows you to manage fuel oil storage tanks via the Internet and delivers precise information on the actual contents of the tanks. The hydrostatic level measurement system consists of a submersible probe with integrated pressure measuring cell and evaluation unit with a transmitter. The transmitter station is supplied by Lithium batteries. External power or data cables are not required. The level of the medium (fuel oil EL, L or Diesel) is measured hydrostatically at regular intervals and transmitted to the data centre via SMS. The incoming data are presented in a detailed overview with the levels at given dates, precise consumption analyses and easy-to-read charts. The user can access this password protected information from anywhere in the world via the Internet.

Proactive purchasing and optimised storage policy

The accurate data allows the user to respond to considerable, seasonal fluctuations in prices. Supplies can be replenished when the prices are low. Unnecessarily high stocks which tie up capital can be avoided.

Monitoring

Tank levels need no longer be read on site. This not only reduces the administrative efforts, but also prevents reading and transcription errors. The user can define a minimum level so that a signal is generated as soon as the level in the tank falls below this value. This is then transmitted via e-mail or SMS.

Reliable consumption analyses

As past data is memorised by the system, levels can be checked retrospectively. These analyses assist in planning and controlling. In addition, the fuel oil management system displays all fuel oil deliveries along with the corresponding dates.

Technical requirements

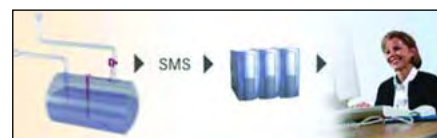
Internet access via Microsoft Internet Explorer 5.0 and higher.
Connection thread G1

Properties of measuring instrument

- Hydrostatic level measurement system for fuel oil EL, L or diesel
- Fully automatic measurement
- Installation possible in tanks with heights or diameters of up to 7.5 m with a maximum cable length of 10 m
- Up to 4 sensors can be connected to one evaluation unit
- Accurate measurements
- Transmission via SMS/GSM
- Battery operated (battery life of 5 years) No external power.
- Waterproof housing

Serviceability

- 24/7 availability
- No additional software required
- Automatic, regular updating of the measured data
- Alarm function
- Data memory
- Display of consumption
- Automatic recording and memorising of fuel oil deliveries
- Automatic calculation of next delivery date

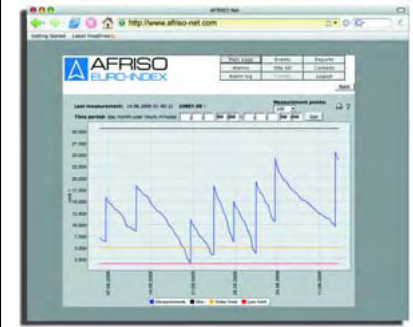


DG: H, PU 1	Part no.	Price €
Fuel Oil Manager INTERNET	90007	
Installation and commissioning		on request
Annual fee for Internet service		on request

EMS 220 event reporting system



AFRISO Net Webservice



Application

The EMS 220 event reporting system is suitable for a wide range of remote monitoring tasks, in particular in building automation and facility management applications. Up to two continuous measurements and two limit values can be monitored with one unit. In connection with the AFRISO Net Webservice, data can also be visualised, logged and managed. Typical application areas comprise:

- Monitoring and management of fuel oil tanks
- Monitoring of heating and service rooms
- Monitoring of ducts, drip pans, pipes, etc.
- Signal forwarding of danger and status messages

EMS 220 can be combined with the following AFRISO signal transducers:

- Level indicators
- Level switches
- Leak detection instruments
- Gas and smoke detectors

Description

EMS 220 has 2 analogue and 2 digit alarm inputs. EMS 220 sends alarm signals or continuous measurement results to the cell phone of the owner or to the AFRISO Net Server for documentation and onward transmission. From the server, messages can be sent via Internet, SMS or e-mail.

The owner can request information on the system status or change parameters via the cell phone at any time. Measuring intervals, limit values and transmission intervals are fully programmable.

Technical specifications

Operating temperature range

Ambient: -20 °C/+50 °C

Supply voltage

AC 230 V

Sensor supply

1 x DC 24 V, max. 25 mA

1 x for probe DIT 01

Alarm inputs

- 1 analogue input 4-20 mA, active or passive
- 1 analogue input for probe DIT 01
- 2 digital inputs, voltage-free

Data transfer

GSM short message system (SMS) with integrated GSM modem
900/1800 MHz

Measuring intervals/ transmission intervals

Programmable as required

Parameter assignment/ configuration

Via cell phone

Housing

Wall mounting housing made from impact resistant plastic (ABS)
W x H x D: 97 x 163 x 62 mm

Protection

IP 30 (EN 60529)

Electrical connections

Cable glands

CE conformity (EMC)

EN 61000-6-2 and 61000-6-3

AFRISO Net Webservice

www.afriso-net.com

The AFRISO Net Server collects all data, archives these in a database and sends status or alarm messages. Measurements are visualised and documented. Reports and trend charts for selectable periods can be created automatically.

AFRISO Net is a cost effective way of getting data online anywhere and at any time.

DG: H	Part no.	Price €
EMS 220	90220	
Set-up fee on AFRISO Net Server (one-off charge)	90013	
Monthly basic charge	90014	

EMS 442 event reporting system



Application

The EMS 442 event reporting system is the ideal solution for a whole range of industrial remote monitoring tasks. Up to 4 continuous measurements and 4 limit values can be monitored with one unit. In conjunction with the AFRISO Net Webservice, data can also be visualised, logged and managed.

Typical application areas comprise:

- Monitoring and management of tank farms, oil storage facilities, silos, food tanks and chemical tank installations
- Level measurement in wells, bore holes, rivers, lakes, etc.
- Monitoring of ducts, pump stations, waste water systems and separators
- Monitoring of production processes
- Monitoring of technical facilities such as heating, air conditioning, refrigerating systems, elevators, etc.

Description

EMS 442 features 4 analogue and 4 digital alarm inputs as well as 2 relay outputs for connection of additional alarm equipment on site. EMS 442 sends alarm signal or continuous measurement results to the cell phone of the user or to the AFRISO Net Server for documentation and onward transmission. From the server, messages can be sent via Internet, SMS or e-mail.

The user can request information on the system status via the cell phone at any time. Measuring intervals, limit values and transmission intervals are fully programmable.

Technical specifications

Operating temperature range

Ambient: -20 °C/+50 °C

Supply voltage

AC 230 V

Sensor supply

4 x DC 24 V, max. 25 mA

Alarm inputs

- 4 analogue inputs 4-20 mA, active or passive
- 4 digital inputs, voltage-free

Relay outputs

Relay contacts:
 2 voltage-free changeover contacts
 Contact rating:
 AC 250 V, 5 A/500 VA
 DC 24 V, 5 A/100 VA

Data transfer

GSM short message system (SMS) with integrated GSM modem
 900/1800 MHz

**Measuring intervals/
 transmission intervals**
 Fully programmable

Parameter assignment/ configuration

Via cell phone

Housing

Wall mounting housing made from impact resistant plastic (polycarbonate)
 W x H x D: 175 x 125 x 75 mm

Protection

IP 65 (EN 60529)

Electrical connections

5 x cable glands M 16

CE conformity (EMC)

EN 61000-6-2 and 61000-6-3

AFRISO Net Webservice www.afriso-net.com

The AFRISO Net Server collects all data, archives these in a database and sends status or alarm messages. Measurements are visualised and documented. Reports and trend charts for selectable periods can be created automatically.

AFRISO Net is a cost effective way of getting data online anywhere and at any time.

DG: H	Part no.	Price €
EMS 442	90442	
Set-up fee on AFRISO Net Server (one-off charge)	90013	
Monthly basic charge	90014	

Sensors for event reporting systems



AFRISO offers a complete range of sensors for a wide variety of applications:

- **Level indicators**

- Liquids (water, oil)
- Solids (powders, granules)

- **Leak detectors**

- Tank leaks
- Leaks in pipes
- Water leaks

- **Alarm devices**

- Smoke
- Fire
- Gas
- Water
- Low water

- **Temperature and pressure measuring instruments**

- Analogue and digital

- **Controllers**

- Heating
- Ventilation
- Pumps
- Valves

Please refer to the corresponding pages of this catalogue for detailed technical descriptions of the individual units and for application examples.

Chapter 15

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Questionnaire/Checklist for enquiries

Level measurement

Company:	Project/enquiry:		
Quantity			
Requirements	☐ Level measurement with local display ☐ Level measurement without local display ☐ Min. level switch ☐ Max. level switch ☐ Level control ☐ Other:		
Preferred measuring principle	Level detection: ☐ PTC thermistor ☐ Conductivity ☐ Vibration ☐ Rotary paddle ☐ Capacitance	Continuous measurement: ☐ Mechanical ☐ Pneumatic ☐ Capacitance ☐ Hydrostatic ☐ Ultrasonic ☐ Guided micropulse (TDR) ☐ Magnetostrictive	
Required outputs	☐ 4-20 mA ☐ 0-10 V ☐ HART ☐ RS 232 ☐ Level switching contacts, number ☐ Other:		
Required accuracy			
Medium to be measured			
Viscosity/density/size of granules			
Dielectric constant (ϵ_r)			
Surface	☐ Calm Foam ☐ Yes, thickness: _____ ☐ Turbulent ☐ No Water content: _____		
Changing media	☐ Yes ☐ No		
Ex protection	☐ No ☐ Yes, Ex zone _____		
Overfill alarm system required	☐ No ☐ Yes, (WHG/TRbF)		
Temperatures	T_{max} medium: T_{max} ambient:		
Tank height/diameter			
Tank shape	☐ Cylindrical ☐ Rectangular ☐ Square ☐ Vertical ☐ Horizontal		
Is the tank pressurised?	☐ No, without pressure ☐ Yes, max. pressure: _____ bar		
Is the tank under vacuum?	☐ No ☐ Yes, max. vacuum _____ bar		
Required process connection	☐ G1B ☐ G1½B ☐ G2B ☐ Flange: ☐ Other:		
Mounting position	☐ Top mounting ☐ Side mounting ☐ Other:		
Location of tank	☐ Aboveground ☐ Underground ☐ Welded in basement		
Tank material			
Are there stirrers, struts or other obstructions in the tank (please enclose sketch)			

Division II 517

*Questionnaire/Checklist for enquiries
Resistance thermometers*

Company:	Project/enquiry:
Quantity	
Application	
Medium to be measured	
Temperatures	T_{max} of medium: T_{max} ambient:
Pressure loads	Static: Dynamic: from to
Measuring range	
Sensor	☐ 1 x ☐ 2 x ☐ Pt 100 ☐ Pt 500 ☐ Pt 1000 ☐ Other: ☐ Class B ☐ Class A according to IEC 751 ☐ 2-wire ☐ 3-wire ☐ 4-wire
Neck	☐ No ☐ Yes, lenght _____mm ☐ Material 1.4571 ☐ Other material:
Installation length	_____mm
Process connection	☐ Fixed male connection ☐ Compression fitting ☐ G ☐ NPT ☐ M ☐ Other: ☐ 1/4 ☐ 1/2 ☐ 18x1,5 ☐ 14x1,5 ☐ Other: ☐ Mounting flange ☐ Ø 41 mm ☐ Ø 80 mm, adjustable ☐ Clamp DN_____ ☐ DIN 11851 DN_____ ☐ Hygienic DN_____ ☐ Other:
Thermowell	☐ Weld-in thermowell as per DIN: ☐ Flanged thermowell, blind flange, DN 25, PN 40 ☐ Other:
Material for process connection or thermowell	☐ Stainless steel 1.4571 ☐ Other:
Reduced measuring tip	☐ No ☐ Yes ☐ 6 mm ☐ 4 mm
Required connection head or electrical connection	
Transmitter installation	☐ No ☐ Yes, output signal ☐ 4-20 mA ☐ 0-10 V ☐ Measuring range of transmitter:
Ex protection	☐ No ☐ Yes, for zone _____
Other	

Questionnaire/Checklist for enquiries

Pressure gauges

Company:	Project/enquiry:		
Quantity			
Application			
Medium to be measured			
Temperatures	T_{max} of medium: T_{max} ambient: T_{min} of medium: T_{min} ambient:		
Pressure loads	Static: Dynamic: from to		
Measuring system	☐ Bourdon tube element ☐ Capsule element ☐ Diaphragm M ☐ Magnetic piston ☐ Other: ☐ Spring diaphragm		
Housing diameter	☐ 40 ☐ 50 ☐ 63 ☐ 80 ☐ 100 ☐ 160 ☐ 250 mm ☐ 4 1/2"		
Range			
Connection	☐ Bottom ☐ Back ☐ Radial at ____ o'clock		
Connection thread	☐ G ☐ NPT ☐ BSPT ☐ 1/8 ☐ 1/4 ☐ 3/8 ☐ 1/2 ☐ 3/4 ☐ Other:		
Mounting type	☐ Direct ☐ Back flange ☐ Sheet steel, black ☐ Stainless steel ☐ 3-hole fixing panel ☐ Black ☐ Chrome plated ☐ Stainless steel mounting bezel ☐ 3-Panel mounting ☐ Black ☐ Chrome plated ☐ Stainless steel bezel + clamp fixing		
Housing	☐ Plastic ☐ Sheet steel, black ☐ Hot pressed brass ☐ Stainless steel ☐ Stainless steel with bayonet type bezel with clip-in front glass		
Housing with blow-out	☐ Yes ☐ No ☐ Safety version S3		
Filling	☐ Without ☐ Glycerine ☐ Silicone oil ☐ Other:		
Front glass	☐ Plastic ☐ Instrument glass ☐ Laminated safety glass Must be resistant to solvents ☐ Yes ☐ No Must be resistant to:		
Wetted parts	☐ Brass ☐ Steel ☐ Stainless steel 1.4571 ☐ Monel ☐ Other:		
Special coatings (diaphragm)	☐ PTFE ☐ Other:		
Measuring system helium tested	☐ Yes qp _v = 10 ⁻⁶ ☐ No		
Dial	☐ Single scale as per EN ☐ Dual scale: ☐ Special scale: Customer's logo ☐ Yes ☐ No Manufacturer's logo ☐ Yes ☐ No		
Accuracy class	☐ 0,1 ☐ 0,25 ☐ 0,6 ☐ 1,0 ☐ 1,6 ☐ 2,5		
Electrical contacts	☐ No ☐ Magnetic spring contact ☐ Inductive contact ☐ Electronic contact ☐ Single ☐ Double ☐ Triple ☐ Quadruple Switching function:		
Other			

Questionnaire/Checklist for enquiries

Diaphragm seals

Company:	Project/enquiry:	
Quantity		
Application		
Medium to be measured		
Material for wetted parts		
Temperatures	T_{max} of medium:	T_{max} ambient:
	T_{min} of medium:	T_{min} ambient:
Pressure loads	Static:	Dynamic: from to
Vacuum	☐ Yes ☐ No	
Special requirements		
Information on the pressure gauge		
	☐ Pressure gauge	☐ Pressure transducer
Housing diameter	☐ 63 ☐ 100 ☐ 160	---
Range/measuring range		
Connection	☐ Bottom ☐ Back	---
Please refer to Questionnaire/checklists „Pressure gauges“ and „Pressure transducers“ for additional specifications		
Details on the diaphragm seal		
	☐ Diaphragm seal	☐ Tongue-type diaphragm seal
	☐ In-line chemical seal	
Process connection (thread type and size / nominal width and nominal pressure)		
Material		
Other		
Mounting of pressure gauge to diaphragm seal		
Direct mounting	☐ Yes ☐ No	
Cooling element between pressure gauge and diaphragm seal	☐ Yes ☐ No	
Mounting with capillary tube	Capillary length _____m Protective hose ☐ Yes ☐ No Height difference between pressure gauge and diaphragm seal _____cm	
Calibration temperature	☐ +20 °C (=standard) ☐ Others: _____	
Preferred filling liquid		
Other		

Questionnaire/Checklist for enquiries

Pressure transducers

Company:	Project/enquiry:		
Quantity			
Application			
Medium to be measured			
Material for wetted parts			
Temperatures	T_{max} of medium:	T_{max} ambient:	
Pressure loads	Static:	Dynamic: from	to
Measuring principle	☐ Piezo-resistive ceramic measuring cell ☐ Piezo-resistive stainless steel measuring cell ☐ Capacitance ceramic measuring cell		
Measuring range			
Pressure type	☐ Relative pressure ☐ Absolute pressure ☐ Differential pressure		
Connection type/connection thread	☐ Standard ☐ Protruding diaphragm ☐ Flush ☐ G ☐ NPT ☐ Other: ☐ 1/8 ☐ 1/4 ☐ 1/2 ☐ Other: ☐ Diaphragm seal mounted: _____ Clamp connection: _____ Dairy fitting DIN 11851: _____		
Housing	☐ Standard ☐ Weatherproof housing ☐ Submersible probe ☐ Weatherproof housing with display		
Electrical connection	☐ Plug DIN 43650-A ☐ Fixed cable _____ metres ☐ PUR cable ☐ FEP cable ☐ Plug-in connector _____		
Output signal	☐ 4-20 mA ☐ 0-20 mA ☐ 0-10 V ☐ Other: ☐ HART ☐ RS 232		
Accuracy of measurement	☐ 0.1 ☐ 0.25 ☐ 0.35 ☐ 0.5 ☐ 1.0 % FS		
Ex protection	☐ No ☐ Yes, for zone: _____		
Accessories	☐ Digital display unit for panel mounting ☐ Without switching output ☐ Digital plug-in display ☐ With _____ switching outputs ☐ Isolating amplifier ☐ Integrated display ☐ Isolating amplifier with power supply		
Other			

Questionnaire/Checklist for enquiries

Water analysis

Company:	Project/enquiry:																
Quantity																	
Application																	
Parameters to be measured and measuring range	Standard: ☐ pH value ☐ Redox ☐ Conductivity= mS/cm Ion-selective (mg/l): <table border="0"> <tr> <td>☐ Ammonium NH_4^+=</td><td>☐ Lead^{2+}=</td></tr> <tr> <td>☐ Bromide Br^-=</td><td>☐ Calcium Ca^{2+}=</td></tr> <tr> <td>☐ Chloride Cl^-=</td><td>☐ Fluoride F^-=</td></tr> <tr> <td>☐ Iodide/Cyanide/I-/CN$^-$=</td><td>☐ Potassium K^+=</td></tr> <tr> <td>☐ Copper Cu^{2+}=</td><td>☐ Sodium Na^+=</td></tr> <tr> <td>☐ Nitrate NO_3^-=</td><td>☐ Silver/ sulphide $\text{Ag}^+/\text{S}^{2-}$=</td></tr> </table> Gases dissolved in the water (mg/l): <table border="0"> <tr> <td>☐ Oxygen O_2=</td><td>☐ Carbon dioxide CO_2=</td></tr> <tr> <td>☐ Chlorine Cl_2=</td><td>☐ Ammonia NH_3=</td></tr> </table>	☐ Ammonium NH_4^+ =	☐ Lead $^{2+}$ =	☐ Bromide Br^- =	☐ Calcium Ca^{2+} =	☐ Chloride Cl^- =	☐ Fluoride F^- =	☐ Iodide/Cyanide/I-/CN $^-$ =	☐ Potassium K^+ =	☐ Copper Cu^{2+} =	☐ Sodium Na^+ =	☐ Nitrate NO_3^- =	☐ Silver/ sulphide $\text{Ag}^+/\text{S}^{2-}$ =	☐ Oxygen O_2 =	☐ Carbon dioxide CO_2 =	☐ Chlorine Cl_2 =	☐ Ammonia NH_3 =
☐ Ammonium NH_4^+ =	☐ Lead $^{2+}$ =																
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☐ Oxygen O_2 =	☐ Carbon dioxide CO_2 =																
☐ Chlorine Cl_2 =	☐ Ammonia NH_3 =																
Measurement conditions	Temperature= °C Pressure= mbar absolute Flow speed= m/s pH value= Conductivity= mS/cm Redox= mV Salinity= Disruptive components (e.g. ammonia in mg/l or mol/l):																
Measuring system/situation	☐ Portable ☐ Stationary ☐ Electrode only ☐ Installation in pipeline ☐ Thread PG13.5 ☐ Other thread: ☐ Installation into existing fitting (please specify):																
Electrode design	☐ Standard 120 mm/Ø 12 mm ☐ Miniature screw-in electrode ☐ Special design (please specify) ☐ Electrode with fixed cable, length= m Plug: ☐ BNC ☐ S7 ☐ DIN plug ☐ Without ☐ Electrode with plug ☐ BNC ☐ S7 ☐ DIN plug ☐ Other:																
Other																	

Questionnaire/Checklist for enquiries

Gas analysis

Company:	Project/enquiry:		
Quantity			
Application			
Type of gas to be analysed (designation)	☐ Exhaust gas ☐ Inert gas	☐ Flue gas ☐ Process gas	☐ Natural gas ☐ Ambient air
Fuel type (for flue gas measurement)	☐ Gas ☐ Wood	☐ Oil ☐ Other: _____	☐ Coal ☐ Waste
Composition of gas to be measured	Concentration range (physical unit)*		Measured component**
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
	*mg/m ³ , ppm, % by vol.		**Please tick
Measuring point	☐ Continuous measurement ☐ Intermittent measurement (selectable)		
Dew point of gas to be measured	_____ °C		
Separation of water possible?	☐ No ☐ Yes, gas cooler available ☐ Yes, please offer gas cooler		
Required temperature in gas paths	☐ Not heated ☐ Frost protection ☐ High temperature version (max. 200 °C)		
Pressure of gas at sampling point	☐ Minimum _____ mbar ☐ Mean _____ mbar ☐ Maximum _____ mbar		
Temperature of gas at sampling point	☐ Minimum _____ °C ☐ Mean _____ °C ☐ Maximum _____ °C		
Sampling point	☐ Outdoor ☐ In enclosed room ☐ Ex zone at sampling point, Class: _____, Zone: _____, Group: _____		
Ambient temperature on site	☐ Minimum _____ °C ☐ Mean _____ °C ☐ Maximum _____ °C		
Installation site	☐ Outdoor ☐ In closed room ☐ Ex zone at sampling point, Class: _____, Zone: _____, Group: _____		
Pollution of gas to be measured, e.g. tar fog, coal dust, fly ash, metal dust, etc.	_____ mg/m ³ _____ mg/m ³ _____ mg/m ³ _____ mg/m ³		

Questionnaire/Checklist for enquiries

Gas analysis (cont.)

Corrosive gas components (please indicate components and concentration)	_____ % by vol./ppm _____ % by vol./ppm _____ % by vol./ppm _____ % by vol./ppm
Length of gas pipe between sampling point and gas analyser	☐ Not heated _____ m ☐ Heated _____ m
Number of measuring points	☐ 1 ☐ 2 ☐ 3
Output signals	☐ 4-20 mA ☐ 0-10 V ☐ 2-10 V ☐ 0-20 mA ☐ Interface:
Automatic calibration	☐ Yes ☐ No
Type of measuring system	☐ Portable ☐ Mobile Cabinet: ☐ Wall mounting ☐ 19" rack mounting ☐ Sheet steel ☐ Glass-fibre reinforced plastic Mounting frame/field devices: ☐ Cabinet ☐ Accessible container ☐ Wall mounting
Measuring system	Emission measuring system: ☐ No ☐ Yes: ☐ TA-Luft ☐ 13th BImSchV ☐ 17th BImSchV ☐ 27th BImSchV ☐ 30th BImSchV ☐ Operational measurement Process measurement: ☐ No ☐ Yes: ☐ Chemical/petrochemical industry ☐ Other, specify industry:
Miscellaneous/ system sketch	

Questionnaire/Checklist for enquiries

Dust measurement

Company:	Project/enquiry:		
Quantity			
Application/dust generating process			
Duct diameter	DN:	Insulation thickness:	mm
Material of pipe or duct			
Dust concentration	mg/m ³		
Particle size	μm		
Relative humidity	%		
Dew point flue gas	°C		
Flow speed	From	to	m/s
Volume flow	m ³ /h		
Mass flow	kg/h		
Pressure at measuring point	mbar		
Temperature at measuring point	From	to	°C
Ambient temperature	From	to	°C
Pollution level of gas to be measured, e.g. tar fog, coal dust, fly ash, metal dust, etc.	_____ mg/m ³ _____ mg/m ³ _____ mg/m ³		
Corrosive gas components (please indicate components and concentration)	_____ % by vol./ppm _____ % by vol./ppm _____ % by vol./ppm		
Codensation	☐ Yes ☐ No		
Pressure surges	☐ Yes ☐ No		
Measuring point	☐ Outdoor ☐ In enclosed room ☐ Ex zone at sampling Class: _____ Zone: _____ Group: _____		
Protection of housing	IP: _____		
Number of measuring points	☐ 1 ☐ 2 ☐ _____		
Output signals	☐ 4-20 mA ☐ 0-10 V ☐ 2-10 V ☐ 0-20 mA ☐ Interface RS 232/485 ☐ Relay contacts: _____		
Type of measuring system	☐ Without display ☐ Separate display module, distance to probe _____		
Measuring system	Emission measuring system: ☐ No ☐ Yes: ☐ TA-Luft ☐ 13th BlmSchV ☐ 17th BlmSchV ☐ 27th BlmSchV ☐ 30th BlmSchV ☐ Operational measurement Process measurement: ☐ No ☐ Yes: ☐ Chemical/petrochemical industry ☐ Other, specify industry: _____		
Other			

Questionnaire/Checklist for enquiries

Volume flow measurement

Company:	Project/enquiry:
Quantity	
Application	
Measured gas	
Measuring ranges	Details ☐ Normal state ☐ Operating status Flow speed From _____ to _____ m/s Volume flow From _____ to _____ m ³ /h Mass flow From _____ to _____ kg/h
Pipe diameter (when used in pipes)	Ø DN _____
Pressure of gas at measuring point	☐ Minimum _____ mbar ☐ Mean _____ mbar ☐ Maximum _____ mbar
Temperature of gas at measuring point	☐ Minimum _____ °C ☐ Mean _____ °C ☐ Maximum _____ °C
Ambient temperature	☐ Mean _____ °C
Condensation	☐ Yes ☐ No
Particle load	☐ Yes ☐ No
Pressure surges	☐ Yes ☐ No
Measuring point	☐ Outdoor ☐ In enclosed room ☐ Ex zone at sampling, Class: _____ Zone: _____ Group: _____
Protection of housing	IP _____
Number of measuring points	☐ 1 ☐ 2 ☐
Output signals	☐ 4-20 mA ☐ 0-10 V ☐ 2-10 V ☐ 0-20 mA ☐ Interface RS 232 ☐ Interface RS 485 ☐ Relay contacts: _____
Type of measuring system	☐ Stationary ☐ Without display ☐ With display ☐ Separate display module ☐ Portable
Measuring system	Emission measuring system: ☐ No ☐ Yes: ☐ TA-Luft ☐ 13th BImSchV ☐ 17th BImSchV ☐ 27th BImSchV ☐ 30th BImSchV ☐ Operational measurement Process measurement: ☐ No ☐ Yes: ☐ Chemical/petrochemical industry ☐ Other, specify industry: _____
Automatic flushing	☐ Yes ☐ No
Other	

Questionnaire/Checklist for enquiries

Event reporting systems

Company:	Project/enquiry:			
Quantity				
Application				
Parameters to be monitored	☐ Level ☐ Min/max ☐ Continuous ☐ Liquid ☐ Solid	☐ Leak ☐ Tank leaks ☐ Burst pipes ☐ Other:	☐ Dangerous cond. ☐ Gas ☐ Smoke ☐ Fire ☐ Water ☐ Low water	☐ Process temperature ☐ Room temperature ☐ Doors ☐ Windows ☐ Burglary
	☐ Other parameters:			
Ex protection	☐ No ☐ Yes, for zone:			
Supply voltage	☐ Battery operated ☐ Mains operated			
Data transmission	☐ GSM ☐ Public telephone network ☐ Other:			
Required alarm inputs	☐ Digital Number: _____ ☐ Analogue Number: _____			
Required alarms	☐ SMS ☐ Call ☐ Internet/E-Mail ☐ Local alarm: ☐ Visual ☐ Audible ☐ Other: ☐ Additional switching outputs: ☐ Additional alarm units			
Remote data polling	☐ Not required ☐ Required - desired parameters:			
Remote programming	☐ Not required ☐ Required - desired parameters:			
Safety functions	☐ Not required ☐ Required - desired parameters:			
Data logging	☐ Not required ☐ Required - desired parameters:			
Data management and visualisation via Webservice (www.afriso-net.com)	☐ Not required ☐ Optional ☐ Required			
Other				

Conversion table for standard pressure units

Unit	bar	mbar	Pa	kPa	MPa	kp/mm ²	kp/cm ²	atm	mmHg	mWs	mmWs	psi	"H ₂ O	"Hg
1 bar	1	1000	100000	100	0.1	0.01019716	1.019716	0.986923	750.062	10.19716	10197.16	14.50377	401.463	29.53
1 mbar	0.001	1	100	0.1	0.001	0.0000101972	0.001019716	0.000986923	0.750062	0.01019716	10.19716	0.01450377	0.401463	0.02953
1 Pa	0.00001	0.01	1	0.001	0.000001	0.0000000102	0.000010197	0.000009869	0.00750062	0.0001019716	0.1019716	0.000145038	0.00401463	0.0002953
1 kPa	0.01	10	1000	1	0.001	0.0001019716	0.01019716	0.00986923	7.50062	0.1019716	101.9716	0.1450377	4.01463	0.2953
1 MPa	10	10000	1000000	1000	1	0.01019716	10.19716	9.86923	7500.62	101.9716	101971.6	145.0377	4014.63	295.3
1 kp/mm ²	98.0665	98066.5	9806650	9806.65	9.80665	1	100	96.7841	73555.9	1000	1000000	1422.3344	39370.08	2895.9016
1 kp/cm ²	0.980665	980.665	98066.5	98.0665	0.0980665	0.01	1	0.967841	735.559	10	10000	14.223344	393.7008	28.959016
1 atm	1.01325	1013.25	101325	101.325	0.101325	0.01033227	1.033227	1	760	10.33227	10332.27	14.6959	406.38658	29.92126
1 mmHg	0.001333224	1.333224	133.3224	0.1333224	0.000133322	0.000013951	0.00135951	0.001315789	1	0.01360	13.60	0.019336	0.53524	0.03937
1 mWs	0.0980665	98.0665	9806.65	9.80665	0.00980665	0.001	0.1	0.0967841	73.556	1	1000	1.4223274	39.37008	2.8959016
1 mmWs	0.000098067	0.0980665	9.80665	0.00980665	0.000009807	0.000001	0.0001	0.000096784	0.073556	0.001	1	0.001422327	0.03937008	0.002895902
1 psi	0.06894757	68.94757	6894.757	6.894757	0.006894757	0.0070307	0.070307	0.068046	51.715217	0.70307	703.07	1	27.68	2.03529
1 "H ₂ O	0.00249089	2.49089	249.089	0.249089	0.000249089	0.00000254	0.00254	0.002458317	1.86832	0.0254	25.4	0.03613	1	0.07356
1 "Hg	0.0338639	33.8639	3386.4	3.3864	0.0033864	0.000345312	0.0345312	0.03342104	25.4	0.345316	345.316	0.49115	13.595	1

Selection criteria for pressure gauges (safety considerations) according to EN 837-2

Medium	Liquid							
Housing	Without filling				With filling			
Nominal size	40/50/63/80		100/160/250		40/50/63/80		100/160/250	
Range bar	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25
Abbreviation key for minimum safety version	0	0	0	0	S1	S1	S1	S1
AFRISO-type designation	All	All	All	All	D6/D7/ D8	D6/D7/ D8	D7/ D8	D7/ D8
Medium	Gas or steam (attention: does not apply to oxygen + acetylene*)							
Housing	Without filling				With filling			
Nominal size	40/50/63/80		100/160/250		40/50/63/80		100/160/250	
Range bar	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25
Abbreviation key for minimum safety version	0	S2	S1	S3	S1	S2	S1	S3
AFRISO-type designation	All	„A“	D4/D9	RF 100/160 Si D4x2	D6/D7/ D8	„B“	D6/D7 D8	RF 100/160 Si D8x2
Explanations of key: „A“ RF 63 Ch D 9x2, RF 63 Si D 4x2, RF 50/63 ST, RF 50/63 GT, RF 63 RG, RF 50 SK D 902, RF 63 MK/IK D 3x2 „B“ RF 63 D 7x2, RF 63 Si D 8x2 0 Pressure gauges without blow-out S1 Pressure gauges with blow-out S2 Safety pressure gauges without solid baffle wall S3 Safety pressure gauges with solid baffle wall (for higher level of safety)								
Note 1: Pressure gauges for oxygen and acetylene must meet the requirements for safety pressure gauges (NG 40 - 80 S2, NG 63/100/160 S3).								
Note 2: Pressure gauges filled with glycerine must not be used for oxygen or other oxidization process fluids. High concentration fluorine liquids and chlorinated liquids (e.g. halocarbon) are suitable for such applications.								
Note 3: This table contains the standard safety version with the corresponding keys. Users must take into consideration any knowledge they have of their own specific requirements and may also use safety pressure gauges at pressures below 25 bar.								

* Please refer to page 530 for pressure gauges for oxygen and acetylene.

Selection criteria for pressure gauges (safety considerations) according to EN 837-2

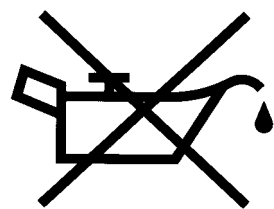
Pressure gauges for oxygen and acetylene

Only safety pressure gauges (S2 and S3) may be used. All materials for wetted parts (parts coming into contact with oxygen or acetylene) must comply with EN 29539.

Pressure gauges for oxygen

The Bourdon tube and other wetted parts must be free from oil and grease. Only those lubricants suitable for oxygen at maximum operating pressure may be used.

The dial must bear the word "oxygen" in English and the international symbol for "free from oil and grease" (symbol 0248 according to ISO 7000 with the "oil prohibited" symbol):

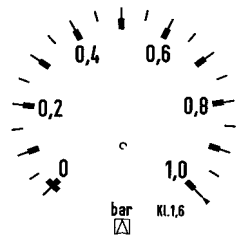
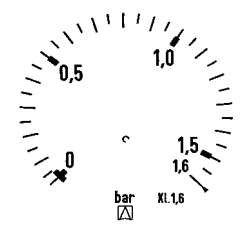
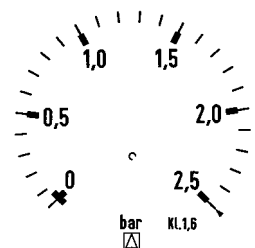
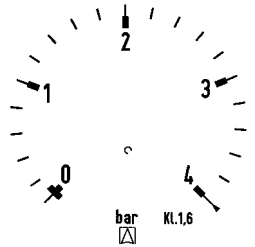
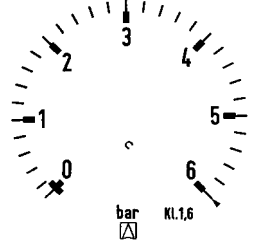


Oxygen and acetylene

	NG 40 - 80 S 2/S 3	NG 100 - 250 S 3
Version	RF 50 ST RF 50 GT adapted to EN 562 RF 63 ST RF 63 GT adapted to EN 562 RF 50 SK D 902 RF 63 MK/IK D 3x2 RF 63 Si D 4x2	RF 100 Si D 4x2 RF 160 Si D 4x2

Dials for pressure gauges - graduation

Housing diameters (NG) 40, 50, 63, 72x72 – accuracy classes 1.6 and 2.5

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 1 bar -1... 0 bar 0... 10 bar -1... +9 bar 0... 100 bar 0... 1000 bar	0.05 bar 0.05 bar 0.5 bar 0.5 bar 5 bar 50 bar	0... 10 mbar -4... +6 mbar -6... +4 mbar -10... 0 mbar 0... 100 mbar -40... +60 mbar	0.5 mbar 0.5 mbar 0.5 mbar 0.5 mbar 5 mbar 5 mbar	-60... +40 mbar -100... 0 mbar 0... 1000 mbar -400... +600 mbar -600... +400 mbar -1000... 0 mbar	5 mbar 5 mbar 50 mbar 50 mbar 50 mbar 50 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 1,6 bar -1... +0,6 bar 0... 16 bar -1... +15 bar 0... 160 bar	0.05 bar 0.05 bar 0.5 bar 0.5 bar 5 bar	0... 16 mbar -6... +10 mbar -10... +6 mbar -16... 0 mbar	0.5 mbar 0.5 mbar 0.5 mbar 0.5 mbar	0... 160 mbar -60... +100 mbar -100... +60 mbar -160... 0 mbar	5 mbar 5 mbar 5 mbar 5 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 2.5 bar -1... +1.5 bar 0... 25 bar 0... 250 bar	0.1 bar 0.1 bar 1 bar 10 bar	0... 25 mbar -10... +15 mbar -15... +10 mbar -25... 0 mbar	1 mbar 1 mbar 1 mbar 1 mbar	0... 250 mbar -100... +150 mbar -150... +100 mbar -250... 0 mbar	10 mbar 10 mbar 10 mbar 10 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 4 bar -1... +3 bar 0... 40 bar 0... 400 bar	0.2 bar 0.2 bar 2 bar 20 bar	0... 40 mbar -15... +25 mbar -25... +15 mbar -40... 0 mbar	2 mbar 2 mbar 2 mbar 2 mbar	0... 400 mbar -150... +250 mbar -250... +150 mbar -400... 0 mbar	20 mbar 20 mbar 20 mbar 20 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 0.6 bar -0.6... 0 bar 0... 6 bar -1... +5 bar 0... 60 bar 0... 600 bar	0.02 bar 0.02 bar 0.2 bar 0.2 bar 2 bar 20 bar	0... 60 mbar -20... +40 mbar -40... +20 mbar -60... 0 mbar	2 mbar 2 mbar 2 mbar 2 mbar	0... 600 mbar -200... +400 mbar -400... +200 mbar -600... 0 mbar	20 mbar 20 mbar 20 mbar 20 mbar	

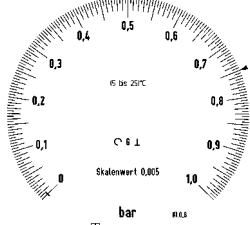
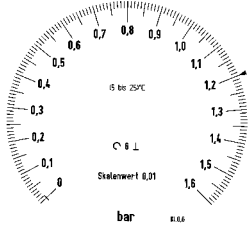
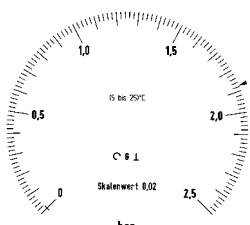
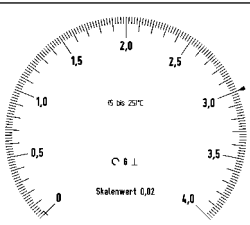
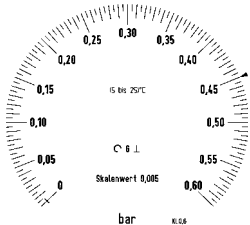
Dials for pressure gauges - graduation

Housing diameters (NG) 80, 100, 160, 96x96, 144x144 – accuracy classes 1.0 and 1.6

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 1 bar -1... 0 bar 0... 10 bar -1... +9 bar 0... 100 bar 0... 1000 bar	0.02 bar 0.02 bar 0.2 bar 0.2 bar 2 bar 20 bar	0... 10 mbar -4... +6 mbar -6... +4 mbar -10... 0 mbar 0... 100 mbar -40... +60 mbar	0.2 mbar 0.2 mbar 0.2 mbar 0.2 mbar 2 mbar 2 mbar	-60... +40 mbar -100... 0 mbar 0... 1000 mbar -400... +600 mbar -600... +400 mbar -1000... 0 mbar	2 mbar 2 mbar 20 mbar 20 mbar 20 mbar 20 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 1.6 bar -1... +0.6 bar 0... 16 bar -1... +15 bar 0... 160 bar 0... 1600 bar	0.05 bar 0.05 bar 0.5 bar 0.5 bar 5 bar 50 bar	0... 16 mbar -6... +10 mbar -10... +6 mbar -16... 0 mbar	0.5 mbar 0.5 mbar 0.5 mbar 0.5 mbar	0... 160 mbar -60... +100 mbar -100... +60 mbar -160... 0 mbar	5 mbar 5 mbar 5 mbar 5 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 2.5 bar -1... +1.5 bar 0... 25 bar 0... 250 bar	0.05 bar 0.05 bar 0.5 bar 5 bar	0... 25 mbar -10... +15 mbar -15... +10 mbar -25... 0 mbar	0.5 mbar 0.5 mbar 0.5 mbar 0.5 mbar	0... 250 mbar -100... +150 mbar -150... +100 mbar -250... 0 mbar	5 mbar 5 mbar 5 mbar 5 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 4 bar -1... +3 bar 0... 40 bar 0... 400 bar	0.1 bar 0.1 bar 1 bar 10 bar	0... 40 mbar -1.5... +25 mbar -2.5... +15 mbar -4... 0 mbar 0... 40 mbar -15... +25 mbar	0.1 mbar 0.1 mbar 0.1 mbar 0.1 mbar 1 mbar 1 mbar	-25... +15 mbar -40... 0 mbar 0... 400 mbar -150... +250 mbar -250... +150 mbar -400... 0 mbar	1 mbar 1 mbar 10 mbar 10 mbar 10 mbar 10 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 0.6 bar -0.6... 0 bar 0... 6 bar -1... +5 bar 0... 60 bar 0... 600 bar	0.01 bar 0.01 bar 0.1 bar 0.1 bar 1 bar 10 bar	0... 6 mbar -2... +4 mbar -4... +2 mbar -6... 0 mbar 0... 60 mbar -20... +40 mbar	0.1 mbar 0.1 mbar 0.1 mbar 0.1 mbar 1 mbar 1 mbar	-40... +20 mbar -60... 0 mbar 0... 600 mbar -200... +400 mbar -400... +200 mbar -600... 0 mbar	1 mbar 1 mbar 10 mbar 10 mbar 10 mbar 10 mbar	

Dials for pressure gauges - graduation

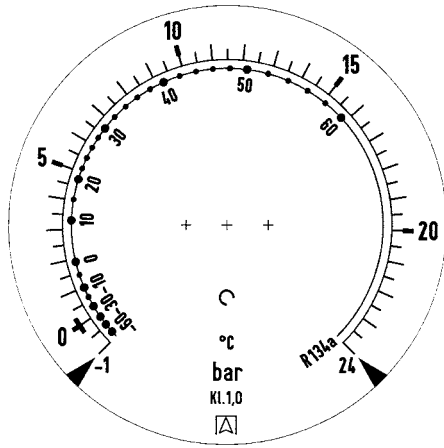
Housing diameters (NG) 160, 250 – accuracy class 0.6 – DIN 16123

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 1 bar -1... 0 bar 0... 10 bar -1... +9 bar 0... 100 bar	0.005 bar 0.005 bar 0.05 bar 0.05 bar 0.5 bar	0... 10 mbar -4... +6 mbar -6... +4 mbar -10... 0 mbar 0... 100 mbar -40... +60 mbar	0.05 mbar 0.05 mbar 0.05 mbar 0.05 mbar 0.5 mbar 0.5 mbar	-60... +40 mbar -100... 0 mbar 0... 1000 mbar -400... +600 mbar -600... +400 mbar -1000... 0 mbar	0.5 mbar 0.5 mbar 5 mbar 5 mbar 5 mbar 5 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 1.6 bar -1... +0.6 bar 0... 16 bar -1... +15 bar 0... 160 bar	0.01 bar 0.01 bar 0.1 bar 0.1 bar 1 bar	0... 16 mbar -6... +10 mbar -10... +6 mbar -16... 0 mbar	0.1 mbar 0.1 mbar 0.1 mbar 0.1 mbar	0... 160 mbar -60... +100 mbar -100... +60 mbar -160... 0 mbar	1 mbar 1 mbar 1 mbar 1 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 2.5 bar -1... +1.5 bar 0... 25 bar 0... 250 bar	0.02 bar 0.02 bar 0.2 bar 2 bar	0... 25 mbar -10... +15 mbar -15... +10 mbar -25... 0 mbar	0.2 mbar 0.2 mbar 0.2 mbar 0.2 mbar	0... 250 mbar -100... +150 mbar -150... +100 mbar -250... 0 mbar	2 mbar 2 mbar 2 mbar 2 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 4 bar -1... +3 bar 0... 40 bar 0... 400 bar	0.02 bar 0.02 bar 0.2 bar 2 bar	0... 40 mbar -15... +25 mbar -25... +15 mbar -40... 0 mbar	0.2 mbar 0.2 mbar 0.2 mbar 0.2 mbar	0... 400 mbar -150... +250 mbar -250... +150 mbar -400... 0 mbar	2 mbar 2 mbar 2 mbar 2 mbar	
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0... 0.6 bar -0.6... 0 bar 0... 6 bar -1... +5 bar 0... 60 bar 0... 600 bar	0.005 bar 0.005 bar 0.05 bar 0.05 bar 0.5 bar 5 bar	0... 6 mbar -2... +4 mbar -4... +2 mbar -6... 0 mbar 0... 60 mbar -20... +40 mbar	0.05 mbar 0.05 mbar 0.05 mbar 0.05 mbar 0.5 mbar 0.5 mbar	-40... +20 mbar -60... 0 mbar 0... 600 mbar -200... +400 mbar -400... +200 mbar -600... 0 mbar	0.5 mbar 0.5 mbar 5 mbar 5 mbar 5 mbar 5 mbar	

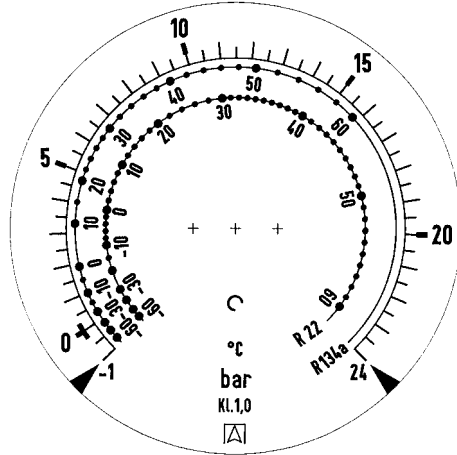
Temperature scales for refrigerating agent dew point temperature

Examples for measuring range -1/+24 bar

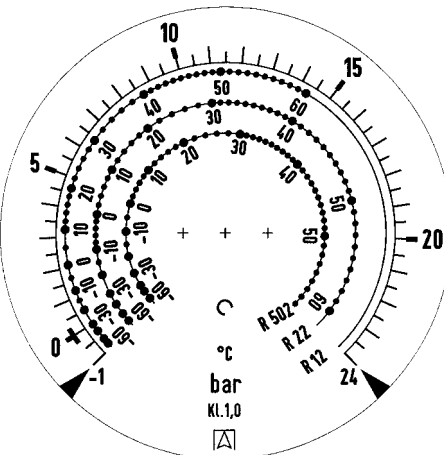
R 134a



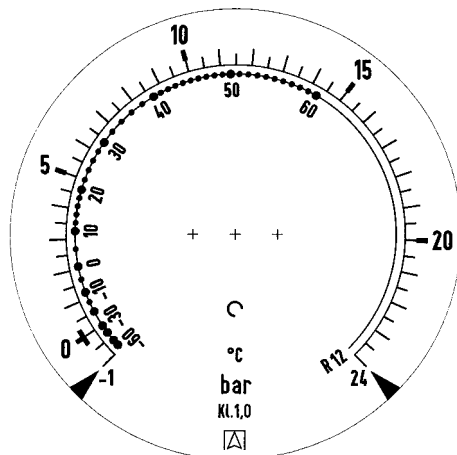
R 134a/R 22



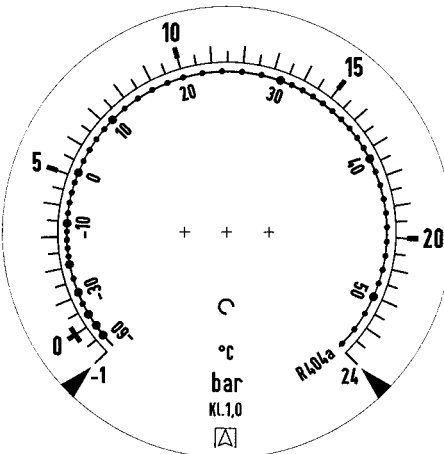
R 22/R 12/R 502



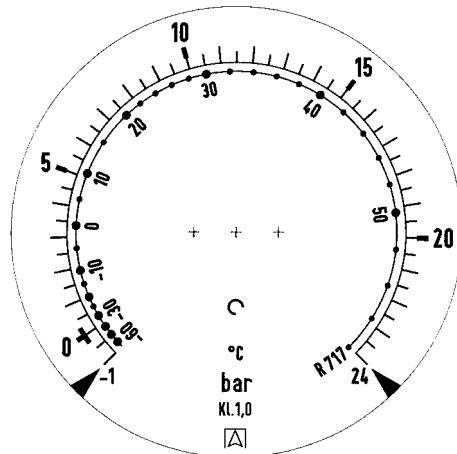
R 12



R 404A



R 717 (NH₃)



Standard colours for temperature scales: R 12 = blue/R 22 = green/R 502 und R 717 = red

Information on the Pressure Equipment Directive (PED) 97/23/EC

Pressure Equipment Directive (PED)

The European Pressure Equipment Directive (PED) came into force on May 30, 2002. The following paragraphs provide some information on the Directive itself and on our activities within the framework of this Directive.

AFRISO-EURO-INDEX GmbH pressure gauges with a full scale value of > 0.5 bar are subject to the Pressure Equipment Directive and meet the appropriate requirements.

The final application conditions of most pressure gauges are not normally known completely at the time of manufacture. We therefore manufacture our products in accordance with the most stringent criteria (gases of group 1).

Our pressure gauges with a full scale value of > 200 bar therefore receive a CE mark according to the conformity procedure.

Pressure gauges with a connection flange of > DN 25 receive a CE mark with a full scale range of 0.5 bar and greater.

The CE mark is attached to the outside of the housing (type designation plate).

A declaration of conformity is provided on request. Detailed operating instructions and the appropriate fact sheets are available at www.afriso.de and are also forwarded on request.

Pressure gauges with a full scale value of less than 0.5 bar and loose diaphragm seals do not fall under the PED and must not carry a CE mark.

Pressure gauges with a full scale value between 0.5 bar and 200 bar fall under „Good Engineering Practice“ and must not carry a CE mark (section 3, paragraph 3).

We are not authorised to CE mark pressure gauges without a company name or a company logo.

Pressure gauges which are used as a part of a safety system to protect against exceeding permissible limit values (equipment parts with safety function) must be given special consideration.

Our pressure gauges conform to the European Standard EN 837-1 and are manufactured and tested according to appropriate requirements.

Information on EN 50379 (portable measuring instruments)

On March 01, 2007 EN 50379 for portable measuring instruments comes into effect. This standard covers devices used to determine the gas concentration and other combustion parameters in the installation and maintenance of domestic and industrial heating systems with standard fuels.

The standard defines the design, testing and operating requirements for portable devices, which are used to determine specific flue gas parameters such as the concentration of individual gas components, the temperature and/or the pressure in combustion processes in order to ensure compliance with national directives regarding the operating behaviour of combustion systems.

The standard is divided into three parts:

Part 1: General requirements and test procedures

EN 50379-1 specifies the general requirements concerning the design, testing and operating behaviour of devices used for short-term measurements to determine specific flue gas parameters such as the concentration of individual gas components, the temperature and/or the pressure in combustion processes in order to ensure compliance with national directives regarding the operating behaviour of combustion systems using commercially available fuels in domestic and industrial applications.

Part 2: Requirements concerning the operating behaviour of devices used in statutory measurements and assessments

EN 50379-2 applies to devices which are used in statutory measurements or measurements specified by regulations. National legislation covering the operating behaviour of combustion systems exists in several European countries. Authorised inspectors use such devices to measure flue gas parameters and verify the compliance of combustion systems with national directives.

Since the results of such measurements have statutory consequences, there are **stringent requirements concerning the accuracy** of these devices. Therefore, EN 50379-2 specifies maximum values for measuring inaccuracy. Tests with real flue gases constitute an essential part in the proof of suitability for statutory measurements. The determination of the measuring inaccuracy must be demonstrated and confirmed with internationally approved methods for the entire measuring range.

Part 3: Requirements for devices in non-regulated areas in the maintenance of gas fired heating installations

EN 50379-3 applies to devices which are used in non-statutory applications. The requirements are **less stringent because the devices** are used in determining whether a gas fired combustion system may require maintenance or in setting up a gas fired combustion system during maintenance. The measuring inaccuracy does not have to be determined for such devices. **These devices do not comply with the technical measuring specifications for measuring devices.** Therefore, devices certified according to EN 50379-3 are not suitable for measuring combustion systems using fuels other than gas.

The standard was ratified on March 01, 2004. Binding dates for all member states:

September 01, 2004 - Day of announcement

March 01, 2005 - Publication as a National Standard

March 01, 2007 - Withdrawal of contravening National Standards

AFRISO- EURO-INDEX is the first European manufacturer to have its complete range of flue gas measuring instruments certified according to EN 50379-2.

All flue gas measuring instruments as well as the „Blue Line“ pressure and temperature measuring instruments meet the stringent requirements of EN 50379-2. The TÜV quality mark (OCTOGON) confirms EN 50379-2 compliance and can only be used, if the production is audited by TÜV-SÜD at regular intervals. This line of measuring devices with the TÜV-OCTOGON mark is backed by experience and competence. High quality pays off - both price/performance ratio and cost of ownership are convincing. High quality measuring devices also help to avoid conflicts and problems in terms of product liability claims. **All „Blue Line“ instruments meet the stringent requirements of EN 50379-2 and can continue to be used without restriction after March 01, 2007.**

ZERTIFIKAT ♦ CERTIFICATE ♦ 認証証書 ♦ CERTIFICADO ♦ CERTIFICAT



Management Service

CERTIFICATE

The Certification Body
of TÜV Management Service GmbH
certifies that

Afriso-Euro-Index GmbH

Lindenstr. 20 • D-74363 Güglingen

Friedhofstr. 3 • D-63916 Amorbach

has established and applies
a Quality Management System for

**Development, production and distribution of
measuring-, control- and monitoring devices for domestic
appliances, industry and environmental protection**

An audit was performed, Report No. **70010777**

Proof has been furnished that the requirements
according to

ISO 9001: 2000

are fulfilled. The certificate is valid until **2007-03-31**

Certificate Registration No. **12 100 14587 TMS**



M. Hagedorn

Munich, 2005-07-18





Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that

AFRISO-EURO-INDEX GmbH
Lindenstr. 20
D-74363 Güglingen

has established and applies
an Environmental Management System for

**Development, production and distribution
of measuring-, control- and monitoring devices
for domestic appliances, industry and environmental protection.**

An audit was performed, Report No. **70010777**
Proof has been furnished that the requirements
according to

ISO 14001: 2004

are fulfilled. The certificate is valid until **2007-03-31**

Certificate Registration No. **12 104 14587 TMS**



M. Hagedorn

Munich, 2006-07-11



EMS-TGA-ZM-07-92

TÜV SÜD Management Service GmbH • Zertifizierstelle • Ridlerstraße 65 • 80339 München • Germany



Product Service

EG-Zertifikat

Nr. EX2 06 10 15639 007

Zertifikatsinhaber: Afriso-Euro-Index GmbH

Lindenstr. 20
74363 Güglingen
DEUTSCHLAND

Betriebsstätte(n):

Afriso-Euro-Index GmbH
Lindenstr. 20, 74363 Güglingen, DEUTSCHLAND

Geltungsbereich:



Elektrische Betriebsmittel in den Zündschutzarten
Eigensicherheit "i" (Eigenherstellung) und Eigensicherheit
"I", erhöhte Sicherheit "e", druckfeste Kapselung "d"
(Fremdherstellung)

Die Zertifizierstelle von TÜV SÜD Product Service GmbH bescheinigt mit diesem EG-Zertifikat, dass das oben genannte Unternehmen ein Qualitätssicherungssystem anwendet, das den Anforderungen gemäß Anhang IV der Richtlinie des Rates Nr. 94/9/EG für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen (ATEX) entspricht. Die Gültigkeit dieses EG-Zertifikates setzt eine regelmäßige Überwachung voraus. Umseitige Hinweise sind zu beachten.

Bericht Nr.: 71312610

Gültig bis: 2009-10-20

Datum, 2006-11-09




TÜV SÜD Product Service GmbH ist benannte Stelle gemäß der Richtlinie des Rates Nr. 94/9/EG für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen mit der Kennnummer 0123.

Seite 1 von 1



Industrie Service

ZERTIFIKAT

Die
Benannte Stelle nach Druckgeräterichtlinie
- Zertifizierungsstelle für Qualitätssicherungssysteme -
der
TÜV SÜD Industrie Service GmbH

bescheinigt,
dass das Unternehmen

AFRISO-EURO-INDEX GMBH

**Lindenstraße 20
74363 Güglingen, Deutschland**

für den Geltungsbereich

**Wassermangelsicherungen und Wasserstandsbegrenzer
als Ausrüstungsteile mit Sicherheitsfunktion
nach EG-Baumusterprüfungen**

ein Qualitätssicherungssystem nach der Europäischen
Druckgeräterichtlinie 97/23/EG Anhang III, Modul D

eingeführt hat und anwendet.

Durch ein Audit, Bericht - Nr.: IS-DDB-MAN-Q-547-06, wurde der
Nachweis erbracht, dass die betreffenden Anforderungen erfüllt sind.

Der Hersteller ist berechtigt, die im Rahmen des Geltungsbereiches
dieses Qualitätssicherungssystems hergestellten Druckgeräte bei der
Kennzeichnung mit unserer Kenn-Nummer wie dargestellt zu versehen:

CE 0036

Zertifikat - Nr. DGR-0036-QS-516-06

gültig bis 14. November 2009

Mannheim, 15. November 2006

TÜV SÜD Industrie Service GmbH
Dudenstraße 28
68167 Mannheim
Germany

Tel.: +49 621 39 52 33
Fax: +49 89 5155 1090
e-mail: gerhard.bundenthal@tuev-sued.de

Notified Body No.: 0036

Member of

CONFÉDÉRATION EUROPÉEN



D'ORGANISMES DE CONTROLE



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. A-9387

This Certificate consists of 2 pages

This is to certify that
Pressure Indicator

with type designations
RF__ , Series D4__ , D7__ and D8__

as specified on page 2

Manufactured by
AFRISO EURO-INDEX GmbH
 Amorbach, Germany

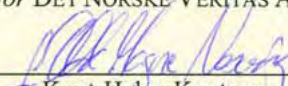
is found to comply with
 Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and
 Det Norske Veritas' Offshore Standards

Application/limitations

Location classes:

Temperature	D
Humidity	B
Vibration	B,C
EMC	Not relevant
Enclosure	C

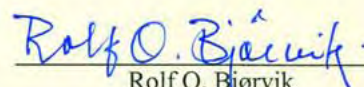
Place and date
 Høvik, 2005-01-17
 for DET NORSKE VERITAS AS


 Knut-Helge Knutsen
 Head of Section



Local Office
 DNV Essen

This Certificate is valid until
 2008-12-31


 Rolf O. Bjørvik
 Surveyor

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